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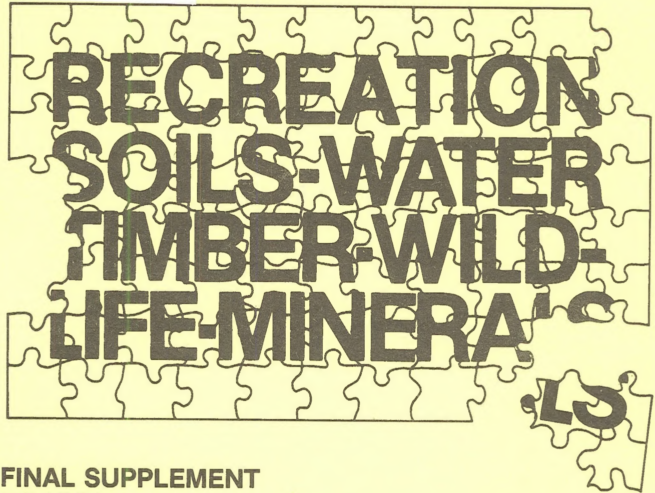

FINAL SUPPLEMENT
TO THE
FINAL ENVIRONMENTAL STATEMENT

PHOSPHATE LEASING
ON THE OSCEOLA
NATIONAL FOREST
FLORIDA

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

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FINAL SUPPLEMENT
to the
FINAL ENVIRONMENTAL STATEMENT
(Int. FES 74-37)
PHOSPHATE LEASING ON THE OSCEOLA NATIONAL FOREST, FLORIDA

Prepared by

DEPARTMENT OF THE INTERIOR
Bureau of Land Management
Eastern States Office
Alexandria, Virginia

Lowell J. Udy
Director, Eastern States
Bureau of Land Management

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SUMMARY

Final Supplement to Final Environmental Statement,
Phosphate Leasing on the Osceola National Forest Florida.

Department of the Interior, Bureau of Land Management

1. Type of Action: (X) Administrative ( ) Legislative.

2. Brief Description of Action: The proposed action, as described in the Final Environmental Statement (Int. FES 74-37), remains exactly the same in this Supplement; it is the proposed issuance of 41 phosphate preference right leases on 52,000 acres of the Osceola National Forest, North Central Florida.

3. Summary of Environmental Impacts and Adverse Environmental Effects: The supplement identifies the following three additional major impacts: 1) Mining without exclusion of certain areas would jeopardize the continued existence on the Forest of the federally-listed Florida panther and red-cockaded woodpecker. 2) Water elevations in the Floridan aquifer would be lowered. 3) The chemical make-up of flow characteristics of Forest streams would be altered.

4. Alternatives: Adds as an alternative the issuance of leases providing for two beneficiation plants on the Osceola National Forest.

5. Comments Were Requested from the Following: Comments were received from those agencies indicated by an asterisk.

- Federal
  - Department of the Interior
    - Bureau of Mines*
    - Heritage Conservation and Recreation Service*
    - Fish and Wildlife Service*
    - Geological Survey*
    - National Park Service
    - Bureau of Indian Affairs*
  - Department of Agriculture
    - Forest Service*
    - Soil Conservation Service*
  - Environmental Protection Agency*
  - Army Corps of Engineers*
  - Council on Environmental Quality
- State of Florida
  - Department of Administration, State Clearinghouse*
- Local
  - Northeast Florida Regional Planning Council*
  - North Central Florida Regional Planning Council*
  - Columbia County Commissioners*
  - Baker County Commissioners*
  - St. Johns Water Management District
  - Suwannee River Water Management District

6. Date Made Available to EPA and the Public:

Draft Statement: December 12, 1973
Final Statement: June 27, 1974
Draft Supplement to Final Statement: April 5, 1979
Final Supplement to Final Statement:

OCT 31 1979

OVERVIEW:

Subsequent to the publication of the Final Environmental Statement (Int. FES 74-37) in June 1974, Thomas S. Kleppe, then Secretary of the Interior, directed that two additional studies be performed. The Secretary said additional information was necessary before a Department decision could properly be made on preference right lease applications within the Osceola National Forest.

The Secretary ordered that the studies be made by the Geological Survey and the Fish and Wildlife Service of the Department of the Interior, in consultation with the Bureau of Mines, the Bureau of Land Management, and the Forest Service of the Department of Agriculture. According to the Secretary, the studies would "thoroughly examine" the impact of the proposed mining on:

--the aquifer that provides the municipal water supply for Lake City, Florida, and that supplies agricultural and other water users in northern Florida, and whether alternative mining and processing techniques or other modifications of the proposal could avoid or mitigate the damage;

--endangered or threatened wildlife species, and the critical habitat of any such species, and whether alternative measures are available to mitigate such results.

When the studies were completed, reports were prepared by the Geological Survey and the Fish and Wildlife Service and released by the two agencies in February and March 1978, respectively. The reports are entitled Impact of Potential Phosphate Mining on the Hydrology of the Osceola National Forest, Florida (GS WRI 78-6), and Osceola National Forest Phosphate Extraction and Processing (FWS Report (Mar. 78)).

In accordance with the regulations, 50 CFR Part 402, the Bureau of Land Management initiated consultation with the Fish and Wildlife Service under Section 7 of the Endangered Species Act of 1973 (P.L. 93-205) on the species which may be affected by the proposed action. The Fish and Wildlife Service's official opinion on this action and its impact on threatened and endangered species is contained in the Biological Opinion letter, dated June 28, 1978 (see Appendix 1).

On April 21, 1978, the Deputy Assistant Secretary, Land and Water Resources (USDI), instructed the Director, Bureau of Land Management, that, in order to facilitate the timely processing of the preference right lease applications, he should begin the preparation of a supplement to the original FES.

This supplement to Int. FES 74-37 covers the same region and lease application areas as the original document, but the scope is limited to only those impacts, alternatives, and new issues that have surfaced since 1974. The supplement draws heavily on the two special study reports discussed above; sections of the FES that were affected by the two studies are supplemented here in much greater detail than most other sections. Other sections have been updated primarily where newly developed information could significantly affect the action under consideration.

To facilitate the review of the supplement and cross-referencing with the original FES, the supplement follows Int. FES 74-37 (see Table of Contents). To review the supplement, the reader must have a copy of the original FES. Also, for the sake of cross-referencing with source documents, and to avoid duplication of material, the two special study reports are cited extensively; they are referred to as GS WRI 78-6 and FWS Report (Mar. 78). The reader will find it useful to have copies of the two special study reports.

The nature of changes to the original FES is indicated in parentheses after each heading in the supplement. Changes may involve additions, revisions, deletions, or the rewriting of entire sections. Indication is also given when no change (see definition in Glossary, Chapter X) has been made in the content of the original FES.

Highlights in the supplement affecting each chapter are as follows:

I. Description of the Action Under Consideration

Summarizes requirements of 1976 Preference Right Leases Regulations (43 CFR 3521). Updates history of the cases. Adds new information on reclamation methods, technology and research needs. Updates supply and demand. Replaces description of the washing and flotation process. Updates purposes of Weeks Law. Provides information on Forest Service RARE II study.

II. Description of the Environment

Replaces description of types of phosphate deposits. Incorporates new description of the phosphate matrix.

An extensive rewrite of the description of the geology and water resource has been done to incorporate new information from GS 78-6.

Description of vegetation rewritten to incorporate classification and the relative abundance quantification used in FWS Report (Mar. 78). Adds material on endangered plants.

Provides complete description of the status and habitat requirements of Federal and State endangered and threatened wildlife and fish species.

III. Environmental Impacts. (These impacts are based upon the worst case condition.)

Updates radiation impacts. Updates impacts on water resources, based on GS WRI 78-6. Recognizes potential for sinkholes.

Quantifies the possible loss of each of the major vegetative types on the Forest. Adds a discussion of the possible impacts to potential habitat for five proposed endangered plants.

Updates some of the existing information and replaces the threatened species discussion in FES. Finds significant adverse impacts to the Florida panther, Bachman's warbler, ivory-billed woodpecker, red cockaded woodpecker, Florida black bear, gopher tortoise, gray bat, eastern indigo snake, Sherman's fox squirrel, Florida sandhill crane, wood stork, and short-tailed snake.

IV. Mitigating Measures

Changes in mitigating measures due to present and draft water quality control regulations, as well as requirements of EO 11990 and 11988 have been incorporated.

Recommends areas of essential habitat for threatened or endangered species from which mining and associated activity will be excluded. The areas of exclusion are Deep Creek, Impassable Bay, Big Gum Swamp, the red-cockaded woodpecker concentration area south of FS 278, and a 200-acre area for each existing and any later-discovered red-cockaded woodpecker colonies in the potential phosphate deposit areas. These comprise about 5,000 acres of the 28,000 acres of the potential phosphate deposits, and 13,000 acres of the 52,000 acres in the lease application areas. This will avoid jeopardizing the continued existence of the Osceola populations of the federally-listed Florida panther and red-cockaded woodpecker, and the State-listed gopher tortoise, and mitigate the significant adverse effects to the Bachman's warbler, ivory billed woodpecker, Florida black bear, gray bat, eastern indigo snake, Sherman's fox squirrel, Florida sandhill crane, wood stork and short-tailed snake.

V. Adverse Effects that Cannot Be Avoided

Water resources section rewritten to reflect supportable conclusions from GS WRI 78-6. Unavoidable impacts are not significantly changed.

VI. Short-term Uses versus Long-term Productivity of the Area

No significant changes to FES.

VII. Irreversible and Irretrievable Commitment of Resources

States that habitat for certain threatened or endangered species may be irretrievably lost. Older pine flatwoods ecosystems, already uncommon in this region of Florida, will become more scarce.

VIII. Alternatives

Adds new alternative to issue leases permitting beneficiation plants on National Forest.

On-forest beneficiation has been described with estimated effects on water resources. Information has been drawn from GS WRI 78-6 and data furnished by the GS District Office, Tallahassee, Florida.

Points to an increase in human disturbance to wildlife due to location of beneficiation on the Forest. This is an adverse effect which cannot be avoided.

Reduces open water area after reclamation from 9,000 acres to 4,600 acres.

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*New sections

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CHAPTER 1

DESCRIPTION OF THE ACTION UNDER CONSIDERATION

A. ACTION UNDER CONSIDERATION (No Change)

B. PHOSPHATE LEASING PROCEDURES

1. Authority (Laws, Regulations, Policies) (Delete paragraph 3 of original section, pg. I-1, and substitute the following)

If prospecting or exploratory work is necessary, a phosphate permit for a maximum area of 2,560 acres per permit may be issued for a period of two years and extended for an additional four years. The issuance of the permit gives the permittee the exclusive right to prospect for phosphate and associated minerals. Discovery entitles the permittee, upon filing for an application for a lease, to a lease for any and all of the minerals embraced in the permit, contingent upon the applicant making an acceptable showing of a valuable deposit (30 U.S.C. Sec. 211(b)) pursuant to the regulations, 43 CFR 3521 (see Appendix 2).

Insert the following after paragraph 3, pg. I-1:

Regulation 43 CFR 3521 requires an applicant for a preference right lease to submit "initial"and "final"showings prior to lease issuance. The "initial showing"is submitted prior to completion of a technical environmental analysis report, and describes proposed mining methods and measures to protect the environment. Initial showings, pursuant to the 1976 regulations, 43 CFR 3521.1-1(b), have been submitted to the Bureau of Land Management by all four of the lease applicants. These showings are being reviewed by the Geological Survey.

After the applicants receive the technical environmental analysis report and proposed lease terms, they must respond with a "final showing"which adequately supports the fact that a "valuable deposit"has been found, as defined by 43 CFR 3520.1-1(c) (see Appendix 2). To meet the test of a valuable deposit, the applicant's final showing must persuade the Secretary of the Interior that the deposit can be mined reasonably and economically, and still meet the Secretary's conditions.

Reword the first sentence of paragraph 8, pg. I-1, as follows: Of the monies received by the Federal Government from lease bonuses, rentals, and royalties on acquired lands, 25 percent is paid to the State for distribution to counties within the Osceola National Forest.

2. Administration (No change)

C. HISTORY OF THE CASES

1. Background (No change)

2. Application for BLM Prospecting Permits (No change)

3. Application for Preference Right Leases (Add the following to the original section, pg. I-6)

The injunction was denied on October 17, 1972, pending compliance with NEPA. The Draft Environmental Statement was filed December 12, 1973, followed by the Final Statement June 27, 1974. On October 28, 1975, the Secretary of the Interior, feeling further studies were needed to specifically examine impacts on hydrological resources and on endangered and threatened wildlife species, ordered additional studies be made by Geological Survey and the Fish and Wildlife Service of the Department of the Interior.

The studies ordered by the Secretary were completed in February and March 1978. On April 21, 1978, the Bureau of Land Management was instructed to begin preparing a Supplement to the original FES.

On May 7, 1976, the Secretary of the Interior issued new regulations for issuance of preference right leases for mining phosphate. Applicants were notified of requirements for complying with the new regulations on July 16, 1976. Monsanto and Pittsburgh and Midway Coal filed initial "showings"under the new regulations on July 5 and October 18, 1977, respectively.

Three court cases have shed light on the authority of the Secretary to implement these regulations and to issue preference right leases. In the first case, Natural Resources Defense Council v. Berklund, it was determined that the Secretary cannot refuse to issue a preference right lease if the appropriate mineral value determination is made. However, the court also determined that the requirement of the National Environmental Policy Act (NEPA) to prepare an environmental statement for major Federal actions which significantly affect the environment does apply to the proposal to issue a preference right lease. The NEPA requirement applies because the Secretary may consider alternatives other than refusal to issue the lease. The court stated that NEPA mandates broad discretion to be exercised in the setting of these lease terms to prevent mining where reclamation is not attainable and to protect air, water quality and wildlife. Because the cost of compliance with lease terms will decide whether the permittee meets the appropriate leasing test, the court also found that the setting of the lease conditions is "crucial"to the determination of whether or not a lease will be issued.

In the case of Kerr-McGee Chemical Corporation v. Andrus, the suit challenged the authority of the Secretary to apply these regulations to preference right lease applicants in the Osceola National Forest. On September 26, 1976, the U.S. District Court ordered the Secretary to issue the leases, but this ruling was dismissed on March 28, 1978, by the U.S. Court of Appeals, on grounds that the applicants had failed to exhaust their administrative remedies. This has been considered by the Department as a judicial sanction of the application of the rules to applicants who had not received a lease before the regulations became final.

As a result of the March 28, 1978 Appeals Court decision, Kerr-McGee and Global were notified on July 11, 1978 that they must comply with new regulations. The two companies subsequently filed initial "showings"under the new regulations.

In a case similar to Kerr-McGee Chemical Corp., a suit brought by Global Exploration and Development Corporation (Global Exploration and Development Corp. v. Andrus) was also dismissed because the company had failed to exhaust its administrative remedies. Global had not shown that the Secretary had refused to perform his statutory duty and make a determination on its lease applications. Relying on the Berklund decision, the court also found that the Secretary is bound to consider NEPA in making a determination of the existence of valuable deposits. In the exercise of his broad discretion to include lease terms under the regulations in 43 CFR 3520.1-1 and 3521.1, the Secretary may adopt lease terms which exceed the current technological capability of the particular lease applicant. "In that case,"the court noted, "the added cost of compliance might outweigh phosphate revenues, causing the applicant to fail the valuable deposit test. Until the applicant developed the requisite technology on a cost-efficient basis, it would be unable to make the statutory showing necessary for the issuance of a lease"

D. PHOSPHATE IN THE LOCAL, REGIONAL AND NATIONAL ECONOMY: A SUPPLY AND DEMAND FORECAST

(Replaces original section, pg. I-6)

(The entire section pertaining to the supply and demand for phosphate has been compiled by the U.S. Bureau of Mines and represents the Bureau of Mines' best estimate of these values.)

United States Production and Consumption

The production history of phosphate rock in the United States after 1880 has been characterized in the past by an exponential rate of growth. The current production level of over 47 million metric tons of marketable phosphate rock was achieved in the span of about 90 years. Both production and domestic consumption are plotted in Fig. 1.

Total marketable phosphate rock production for the United States in 1977 was 47,256,094 metric tons. 40,575,041 metric tons were produced in Florida and North Carolina, 1,746,922 in Tennessee, and 4,934,131 in the Western States.

In general, Florida's and North Carolina's 1977 phosphate production was used in fertilizer and animal feed supplements. All of Tennessee's production was processed in electric furnaces to produce elemental phosphorus, from which a large variety of phosphorus chemicals were manufactured. Western States' production was divided about equally between agriculture and industrial products. All of the phosphate rock processed in electric furnaces in the Western States was mined in Idaho. Of the 4,264,571 metric tons produced in Idaho, 1,965,567 were processed in electric furnaces.

A total of 13,230,000 metric tons of phosphate rock was exported in 1977. Of this total, 12,759,000 metric tons were exported from Florida and North Carolina, while 471,000 metric tons were exported from the Western States.

Forecast:

Capacity

An estimate of the present and future capacity of phosphate rock mining in each of the principal regions of the United States was developed through Bureau of Mines interviews with the producing companies. The projected cumulative capacity of the mines in each of the principal regions was tabulated for each year to the year 2000. The capacity in central Florida is projected to increase from 38.3 million metric tons in 1978 to 46.9 million metric tons in 1985, and to decrease gradually thereafter to 35.4 million metric tons by 2000. The capacity of the existing mines in North Florida will increase from 2.3 million metric tons in 1978 to 4.5 million metric tons in 1987, and maintain this level to the end of the century. In North Carolina, capacity will increase from 3.2 million metric tons in 1978 to 10 million metric tons in 1985, and maintain this level until 2000. The capacity of the Western States will increase gradually from a current 6.1 million metric tons to 6.6 million metric tons by 2000. Capacity in Tennessee will remain at 1.7 million metric tons for the rest of this century.

Estimates of capacity were based on the best estimates available from each company currently mining or processing phosphate rock, or if not doing either at present, at least in a position to use the phosphate rock in existing plants. Any increases in capacity can be expected to

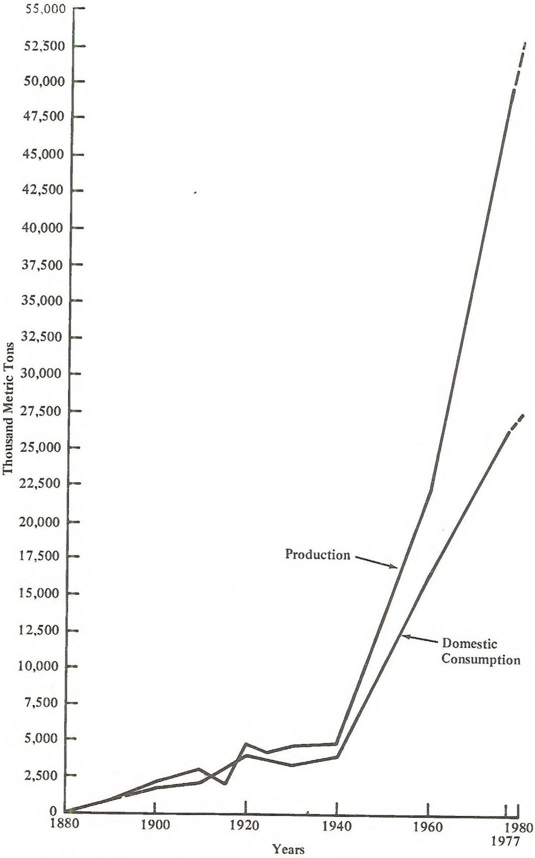


Figure 1. United States Phosphatic Rock Trends Production and Consumption

occur because of increases in the capacity of existing mines, rather than the opening of new mines. In the years to come, actual capacity in excess of these estimates is not likely to develop unless there is an unforeseen increase in the demand for phosphorus. The regional markets, particularly those of the Western States, will limit total production. One can assume that, even though companies may open new mines, older mines in the same region will close. Therefore, the total projected capacity of the region will remain unchanged. Future mining capacity will also depend upon new mine investment and changing operating costs. This relationship will be particularly evident in North Carolina, north Florida, and central Florida, where the development of new mines probably will be inhibited by current and future costs. Capacity in excess of these estimates will be developed only if market prices support cost, or if a particular company has a captive market to justify the cost of mining phosphate rock in the future.

Production

Estimates of production of phosphate rock for each region were based on available planned capacity and future demand figures. Market estimates for agriculture fertilizers and animal feeds were established by the Economic Research Service of the U.S. Department of Agriculture (USDA). Market estimates for elemental phosphorus were developed with the cooperation of the principal manufacturers. Fig. 2 charts the expected production from each region of the United States to the end of the century.

Western States

The demand for phosphate rock—and, therefore, its production—will be limited in the Western States by a number of factors: the geographic location of the deposits; their high mining cost as compared with those of the eastern United States; the limited local markets for fertilizer; and the probable reduction, either by legislation or voluntary reformulation on the part of detergent manufacturers, of the phosphorus content in detergents. In addition, it is probable that rising costs will dictate that the production of high purity phosphoric acid from electric furnace phosphorus be phased out, and the purification of wet process phosphoric acid be increased. No likely timetable is available, but eventually this change could shift this sector of production from the Western States to eastern locations. The annual growth rate for total phosphate rock production in the Western States will not exceed 1 percent—from 4.9 million metric tons in 1977 to about 6.2 million metric tons in 2000.

Tennessee

Production in Tennessee will be maintained at present levels only if the loss of phosphorus in detergent markets is compensated by growth in other industrial markets. A production level of 1.7 million metric tons per year is forecast to the end of the century.

North Carolina

Production is expected to increase significantly in the State, from 2.3 million metric tons in 1977 to 8.6 million metric tons at the end of the century.

North Florida

By the end of the century, production in this region is expected to increase from 2.1 million metric tons to a level of 4.5 million metric tons, yielding 700,000 metric tons per year of 100% P_2O_5 superphosphoric acid for export. The lease application areas in the Osceola National Forest have not been considered in the production forecast for this region. Should the proposed leases be issued, there would be a lag time of about seven years prior to production. If production on the Forest takes place, about 3.6 million metric tons would be produced each year for a 30-year period.

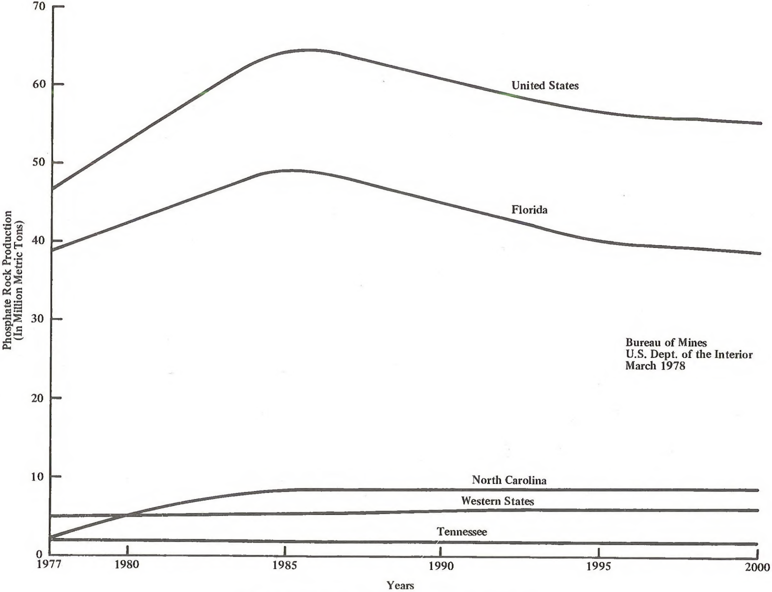
Central Florida

This area will continue to be the principal United States production center for phosphate rock. Annual production will increase from 35.4 million metric tons in 1977 to a peak of 45.7 million metric tons in 1985. Annual production will decline thereafter, falling to 34.6 million metric tons by the year 2000. Production forecasts for Central Florida will probably be met by existing plants with identified reserves and, in future years, by replacement mines operating at higher costs. Increases in costs and decreases in the availability of acceptable reserves are both likely to restrain production in Central Florida after 1985.

Demands

A number of markets for phosphate rock can be identified. Both the quantity consumed in the United States for agricultural and industrial purposes and the quantity converted into higher value fertilizer intermediates or products and exported are considerations, as is the quantity of phosphate rock exported in unprocessed form. Estimates of the supply to these markets to the end of the century were made. The total amount of phosphate rock sold or used by the United States is expected to equal the nation's total production.

The scenario presented here reflects the fact that the two domestic demands—agricultural and industrial—are distinct. The growth rate in the agricultural demand for phosphates was forecast by U.S.D.A. at about 2.3% per year. The growth rate for the industrial segment has been forecast, by a consensus of producers and an opti-



Bureau of Mines
U.S. Dept. of the Interior
March 1978

Figure 2. United States Phosphate Rock Production Projection
(Million Metric Tons)

mistic assessment of the markets, to be level. In any projection of demand, exports of both phosphate fertilizers and phosphate rock are variables. It is generally agreed that a worldwide trend among producing countries to convert phosphate rock to higher value products will prevail. This trend is reflected by the initiation of fertilizer exports from north Florida in 1979. Phosphate rock exports are expected to increase to about 15 million metric tons through the 1980's and decline in the 1990's. Demand in both rock and equivalent rock as fertilizer may vary from this forecast, but it is probable that the two sources of demand, taken together, will meet the total projected export demand.

The demand projection data is graphed in Fig. 3. The consumption of phosphate rock in the United States that will be used for fertilizer and chemicals is blocked into the lower section of the graph, followed by the quantity of rock exported as fertilizer, and then by the quantity of rock exports. The curve or summation of all demands is the estimated future production.

E. DESCRIPTION AND QUANTIFICATION OF THE PHOSPHATE OPERATION

1. Assumptions (Replaces assumption d, pg. I-9)

Total water requirement is estimated to be 227 million gallons per day, with 16,361 acre-feet/year (14.6 million gallons per day) needed from the Floridan aquifer.

2. Overview of the Operation (No change)

3. Mining Methods (No Change)

4. Reclamation Methods (Add the following to the original Section pp. I-16-I-18)

Current Technology

Reclamation methods currently in use by industry are classified by the materials moved: (1) water body construction; (2) sand tailings fill; (3) clayfill; (4) sand-clay mix; and (5) overburden fill. (These methods are described in Appendix 9, along with several reclamation processes in development that use a sand-clay fill mix to accelerate the dewatering of clay slimes and permit their direct return to the mined out areas. These include sand spraying, flocculation-mix, and dredge-mix.)

The reclamation procedure that is selected will, in large measure, determine the ratio of land to lakes. There is flexibility within each method so that systems can be designed to leave land and lakes in varying proportion to each other. When slimes and sand tailings are returned to the mined areas, little increase in surface water areas is necessary. If a number of lakes is created and above-ground storage of clay is not used, some elevated ground will result.

Reclamation on the Osceola National Forest

Overall Goals of Reclamation.

The goal of reclamation of mined land within the Osceola National Forest would be the restoration of the existing resource and reestablishment of its multiple use, sustained-yield capabilities. Management objectives for the Osceola include sustained timber and forage production, wildlife and watershed management, and recreation. Reclamation would in all probability be aimed at reestablishing, as nearly as possible, the same type of plant and aquatic communities with the same interspersion of community types, i.e., pine flatwoods, cypress swamps, creek swamps and lakes, as is now present. Emphasis would be placed on maximizing land surface area rather than creating lakes.

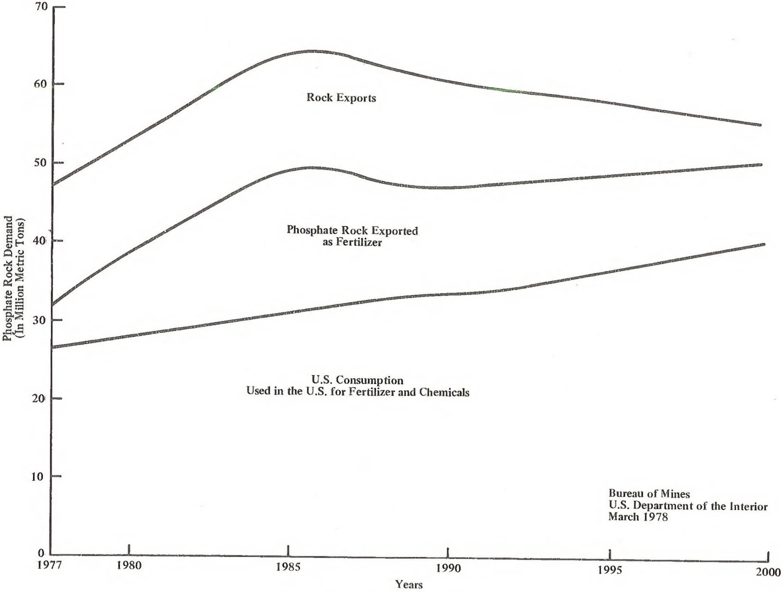
Reestablishment of Commercial Sawtimber Stands.

In the course of preparing this supplement, the question of whether it would be possible to reestablish commercial sawtimber production on phosphate mined lands within the Osceola National Forest surfaced as a specific issue.

In November 1978, forest vegetation was inspected on old mine sites in central Florida. Eighteen-year-old pine plantations, planted on overburden and debris disposal areas mined about 1926, were comparable in growth to plantations of the same age on native soils. Small groves of eight-to-twelve-year-old pine, planted for aesthetic purposes on overburden bordering fertilized pasture, were also growing well. Mine disposal sites dating back to 1910 had revegetated naturally to a variety of pines and oaks. Recent trial plantings designed to determine the utility of various tree species in different reclamation environments indicated varying degrees of success. Producing citrus groves were observed on replaced overburden.

It cannot be conclusively stated that the same results will occur on the Osceola, due to the significantly different environmental conditions, mining methods and waste disposal characteristics. Management objectives on the Osceola— including the production of high quality sawtimber rather than pulpwood—are also different from those on the lands observed. Nothing to date has proven or demonstrated that commercial sawtimber production on a 60-year rotation will be reestablished on mined lands within the Osceola. However, it is not unreasonable to expect that attempts to establish commercial sawtimber on mined lands on the Osceola would stand a good chance of success, providing the appropriate investment is made in defining the environmental requirements of the target species, in engineering the required land surface/water relationships, and in providing the biological inputs to meet those environmental requirements.

A discussion of the relevant information, including the engineering considerations leading to these expectations, is contained in Chapter XII, Appendix 10.



Bureau of Mines
U.S. Department of the Interior
March 1978

Figure 3. United States Phosphate Rock Demand Projection
(Million Metric Tons)

Reclamation Research

There has been little systematic research into the biological aspects of reclamation techniques for phosphate lands. The research that has been done and the practical reclamation experience gained in Central Florida have an urban or agricultural orientation. On the other hand, technology transfer from other areas is possible. Research carried out by the U.S. Army Corps of Engineers Waterways Experiment Station has demonstrated that tidal wetlands can be established on dredged material under widely varying conditions (Boyce, J. Scott, 1978. Tidal marsh development with dredged material. Shore and Beach, 46(2)25-31). Several other groups working with tidal marsh reclamation and shoreline stabilization have had considerable success. (For example, see Woodhouse, W. W. Jr., E. D. Seneca and S. W. Broome. 1974, Propagation of *Spartina alterniflora* for substrate stabilization and salt marsh development: Technical Memorandum No. 46, U.S. Army, Corps of Engineers Coastal Engineering Research Center, Fort Belvoir, Virginia. Also: Webb, J. W. and J. D. Dodd, 1978, Shoreline plant establishment and use of a wave stilling device: MR 78-1, U.S. Army, Corps of Engineers Coastal Engineering Research Center, Fort Belvoir, Virginia. Also, E. W. Garbisch, Environmental Concern, Inc., has related similar findings in a personal communication.) Observations of trial plantings of many kinds of herbaceous and woody vegetation on phosphate mined land suggests that reclamation to wooded upland and wetland communities is possible.

The present primitive state-of-the-art of phosphate mine reclamation precludes the evaluation of the potential impact of future mining and reclamation on the Osceola by merely extrapolating present technology to future conditions. Research is needed to provide the technological base required to restore to the "natural"-systems of the Osceola.

Research is needed to provide:

1. Techniques to reestablish the soil-water regime found in the Osceola;
2. Information as to the influence of substrate quality on plant community
structure;
3. Practical techniques for reestablishing the plant species native to the
Osceola.

The approach used for determining reclamation methodologies related to soil-water-plant relationships should focus on past conditions that have evolved on mined areas in Florida. Areas that were not reclaimed have developed many different plant community types reflecting the nature of the substrates and water regimes. Investigations of several sites that reflect varying plant communities should quickly provide background data on soil-plant-water relationships on mined lands. Additional greenhouse work and field plot work would compliment this research and provide considerable insight into the influence of substrate quality on plant growth. Basic engineering research is needed to provide techniques for reestablishing land and water relationships. Basic soils, biological and plant materials research is needed to provide techniques for reestablishing the plant species and vegetative community types now found on the Osceola.

5. Process Descriptions (New introductory material added to original text, pg. I-18)

Major equipment of the beneficiation plant site would include the washer, feed preparation unit, and flotation plants. A thickener would probably be included in the process operation (its dimensions and integration into the process have not been determined). The efficiency of the beneficiation plant has been projected at about 78% (i.e., 78% of the flotation feed will emerge as concentrate). It is projected that approximately 100% of the pebble would be recovered in the washing process. The combined recovery would be approximately 81% of the feed and pebble-size phosphate values in the ore slurried to the plant.

a. Washing and Flotation (Replaces original section, pp. I-18-I-24. The following clarifies the section in the original FES and elaborates on storage of the washed, over-sized pebble fraction and disposal of the clayey wastes.)

Washing and flotation methods differ slightly, and are dependent on: the screen analysis of the feed; the ratio of washer rock to flotation feed; the proportions of phosphate, sand, and clay in the matrix; and the equipment used. The matrix slurry is pumped through pipelines to the washer plant, with the solids content varying from 20 to 50 percent. As the matrix slurry passes through the hammer mills and log washers, a series of screens separates the sand and clay from the phosphate-bearing pebbles. The final separation is usually made at a screen size of 14-mesh. The final product consists of the washed, over-sized pebble fraction, which is conveyed directly to wet rock storage. The screen undersize is dewatered and deslimed to separate the fraction smaller than 150-mesh which is slurried to slime ponds or clay disposal areas. (The slimes arrive at these clarification areas as 3-5% solids. At the clarification areas, the clay settles and the clarified water is recirculated to the mine and plant for reuse). The 14-mesh to 150-mesh fraction is processed through a primary classification section. A separation is made at 35-mesh. The 14 to 35-mesh fraction is called the coarse feed, from which a coarse concentrate is obtained through gravity and flotation processes. The 35 to 150-mesh fraction is processed through a flotation section to recover a fine concentrate. After processing, both the coarse and fine concentrates are transferred to wet rock storage. The tailings of waste from the coarse concentrate are used in dam construction or land reclamation. The waste from the fine concentrate, a sand, is pumped into previously mined areas.

In summary, three concentrates of marketable phosphate rock are produced: a 3/4-inch by 14-mesh pebble, a coarse 14- to 35-mesh fraction, and a fine 35- to 150-mesh fraction. These are transferred from wet rock storage and blended to satisfy shipping requirements. Fig. 4 is a typical flow sheet for an operation of this type.

Subsections b, c, d, e, f, g, h, and i of section E.5, Process Descriptions, are unchanged.

6. Process Waste Characterization (No change)

7. Additional Process Control (No change)

F. RELATIONSHIP OF CONSIDERED ACTION TO NATIONAL FOREST LAND USE PLANS, POLICIES, AND CONTROLS

1. Osceola National Forest Plans

Replace, *The Weeks Law of 1911*, pg. I-32, with the following:

—*The Weeks Act of 1911*, which authorized the purchase of forested, cut-over or denuded lands within the watersheds of navigable streams necessary to the regulation of the flow of navigable streams or for the production of timber. This is the legislation that authorized the purchase of most of the lands of the present Osceola National Forest.

Replace—Other Laws, Executive Orders and Regulations which apply to the National Forest, pg. I-32, with the following:

—Other Laws, Executive Orders and Regulations which apply to the National Forests, e.g., Endangered Species Act, Clean Water Act, Executive Order 11988, Floodplain Management, and Executive Order 11990, Protection of Wetlands.

2. Suwannee River RC&D Plan (No change)

3. State Multi-County Planning (Replace the last two paragraphs of the original section, pg. I-34, with the following)

The multi-county planning agency for District 3 is the North Central Florida Regional Planning Council, in Gainesville; for District 4, the Northeast Florida Regional Planning Council, in Jacksonville.

4. Roadless Area Review and Evaluation (RARE II) (New section)

The Forest Service conducted a study of lands within the National Forest System to determine what recommendations should be made for consideration by Congress of additions to the National Wilderness Preservation System. (Additional information may be obtained in RARE II Final Environmental Statement, Roadless Areas Review and Evaluation, U.S. Department of Agriculture, Forest Service, January 4, 1979, and in RARE II, Gulf Coast States and Puerto Rico, Supplement to Draft Environmental Statement Roadless Area Review and Evaluation, U.S. Department of Agriculture, Forest Service, June 1978.)

The first portion of the study, initiated during 1977, was an inventory of lands meeting certain criteria.

In June 1978, a Draft Environmental Statement regarding these lands was issued for public review and comments. After review, analysis and revision as necessary, a Final Environmental Statement on RARE II was issued by the Forest Service on January 4, 1979, placing individual areas or portions thereof in one of the following three categories:

—Recommend for wilderness

—Used for non-wilderness purposes

—Subject to further planning for all management options

Three areas within the Osceola National Forest have been inventoried (See Map 1, Chapter XI of this Supplement). These areas, their inventory numbers, their acreage, and the potential phosphate deposit acreage within them are listed in Table 1.

A majority of the acreage within the inventoried areas was listed in Int. FES 74-37 as "highly sensitive areas."

The Administration's decision on the National Forest System Roadless Area Review and Evaluation was released on April 16, 1979. This decision placed the three Osceola RARE II areas in the following categories:

Big Gum Swamp — 08010 — Recommend for wilderness

Impassable Bay — 08107 — Used for non-wilderness purposes

Natural Area — 08108 — Subject to further planning for all management options.

5. The Florida State Comprehensive Plan

The Governor of Florida accepted this Plan on February 9, 1978. It contains the following State objectives and policies for managing mineral resources:

—Mineral resources should be used with maximum efficiency.

—Reasonable options for the future use of minerals should be protected.

—Mineral sites should be reclaimed after the resource is depleted so that the site can be used productively for other purposes.

—Coordinate mining plans, operations, and reclamation with land planning at all levels of government.

—Encourage the conservation and efficient use of nonrenewable mineral resources.

—Encourage research and development in extraction technology.

—Encourage reprocessing or scavenger operations.

—Encourage the use of by-products generated during the mining and refining of the principal ore.

—Encourage research into the State's lesser-known minerals.

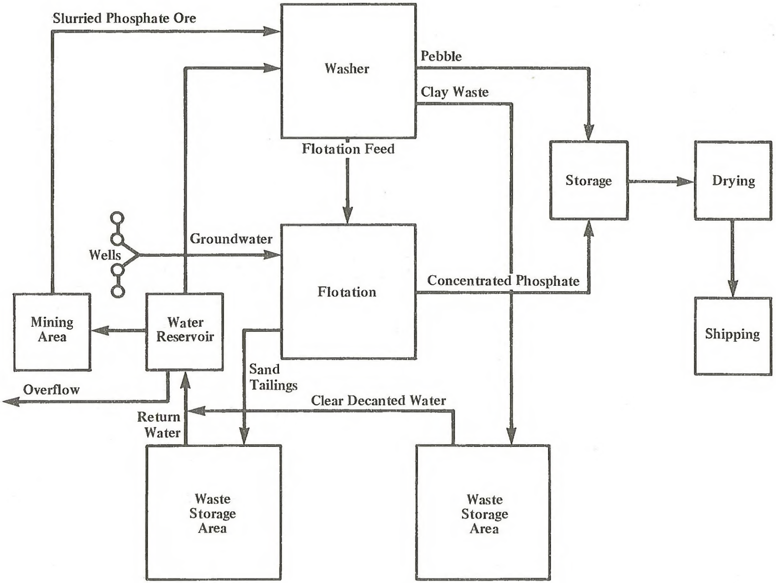


Figure 4. Typical Process Flowsheet

TABLE 1--Areas within the Osceola National Forest Inventoried under RARE II.

Inventoried Area	Inventoried Area Number	Inventoried Area Acreage	Potential Phosphate Deposit Acreage
Big Gum Swamp	08010	13,600	1,750
Impassable Bay	08107	6,240	780
Natural Area	08108	4,380	None
TOTAL		24,220	2,530

—Encourage geological exploration of the State and the compilation of all existing minerals data into a "minerals atlas"

—Encourage the protection of future mineral extraction sites through sequential land use and time-phased land use regulations.

—Require mandatory reclamation of future mining sites.

—Encourage innovations in land reclamation technology.

—Identify and evaluate all hazards associated with reclaimed lands.

—Plan and coordinate mining and processing activities with available water supplies to ensure the protection and most beneficial uses of water resources.

CHAPTER 2

DESCRIPTION OF THE ENVIRONMENT

A. NON-LIVING COMPONENTS

1. Geology

a. Structural Geology (Adds new material after paragraph 2, page II-1)

The following information is from GS WRI 78-6, pp. 10 and 14:

The dominant influence on sedimentation in northern Florida from early Mesozoic (Jurassic) until middle Cretaceous time (Austinian Stage) was an anticlinal structural high named the Peninsular Arch. Sediments deposited during this period slope and thicken gradually to the northeast and southwest from the crest of the Arch. The Ocala uplift, located parallel to and southwest of the Peninsular Arch, affects the thickness and depositional patterns of middle Eocene and younger sediments.

Northeast of the Forest, a thick sequence of Mesozoic and Cenozoic deposits occurs in a northeast-plunging syncline called the southeast Georgia or Savannah basin. This has been the site of more or less continuous deposition since Jurassic time. To the west of the Forest is the Apalachicola or Southwest Georgia embayment, a syncline whose axis plunges southwest toward the Gulf of Mexico. This syncline has also been the site of continuous deposition since Jurassic time. The Ocala uplift and the southeast Georgia basin are the two structural features which have most directly affected sedimentation in the area of investigation since Eocene time.

b. Surface Geology (No change)

c. Subsurface Geology (Replaces entire section, pg. II-1)

It has been shown by deep oil-test wells (GS WRI 78-6, pg. 10) that the Osceola National Forest is underlain by a sequence of Coastal Plain sediments whose minimum thickness is 2,500 feet. These sediments are predominantly of shallow-water origin and are composed of marine limestones, evaporites, and clays that range in age from Early Cretaceous to Holocene. They were deposited on lower and middle Paleozoic rocks that consist of flat-lying black micaceous fissile shales with thin interbeds of white quartzite. Table 2, the general stratigraphic column, includes a brief description of the lithology, thickness, and hydrogeologic character of the geologic units underlying the area. Figure 5 is a generalized geologic map showing the distribution of the various formations in northeast Florida as recognized by the Florida Bureau of Geology.

2. Mineral Resources

a. Phosphate

(1) Overburden (No change in the original text, but delete Figs. 12 and 13, pp. II-5 and II-6)

(2) Matrix (replaces original text, except for first paragraph, pg. II-1)

Known phosphate deposits in Florida have been grouped into land pebble, river pebble, primary, and hard rock types by the British Sulphur Corporation, 1961, (cited in GS WRI 78-6, pg. 14).

The type of phosphate that underlies most of the western half of the Osceola National Forest, and the type being mined in Hamilton County, Florida, as of 1977, is land pebble. Land pebble deposits are generally the most extensive and highest grade deposits found in the state, and are typified by the Pliocene Bone Valley Formation of central Florida. Land pebble phosphate is varicolored, sand- to pebble-sized, is usually mixed with vertebrate remains, occurs in a matrix of clay and/or sand, and is the result of both shallow marine and terrestrial deposition.

The river pebble phosphate that is mined in the coastal region of central Florida is reworked land-pebble material, occurring in recently formed bars and valleys of present streams. River-pebble phosphate is generally of a lower grade and occurs in less extensive deposits than does land pebble phosphate.

Primary phosphate deposits occur beneath Baker County and eastward. The deposits occur as dark brown to black, medium- to very coarse-grained sand-sized, low to high grade, primary phosphate in a matrix of water-polished quartz sand. The deposits are thought to have formed by the direct precipitation of phosphate from seawater. Similar deposits occur in the Middle Miocene Pungo River Formation in North Carolina. Deposits of this type of phosphate are associated with a relatively abrupt change in the slope of the floor of the basin of deposition, and occur in 300 to 600 feet of water (Miller, 1971, pp. 52-57).

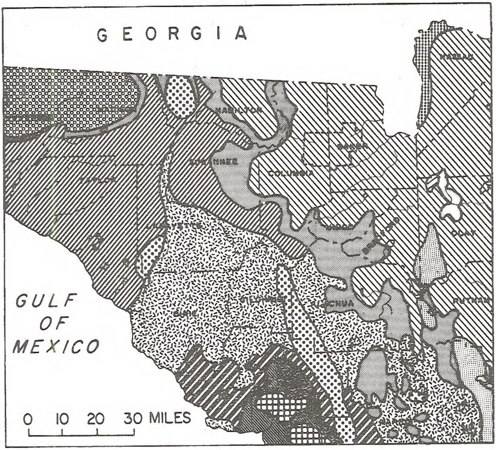
A fourth type of phosphate deposit is the hard-rock phosphate found as filling of erosional or solution depressions in limestone in north-central Florida. This type of phosphate is characterized by large boulders, pebbles, and plates of phosphate and/or phosphatized limestone mixed with material of smaller size. Some of the phos-

TABLE 2-- Geologic Units in Baker, Columbia, Hamilton, and Suwannee Counties, Florida, and Their Hydrogeologic Character

Erathem	System	Series	Gulf Coast Stage (After Murray, 1961)	Formation or Group		Thickness (feet)	Lithology	Hydrogeologic Unit	Water Bearing Properties
Cenozoic	Quaternary	Holocene to Pleistocene	Post Glacial to Nebraskan	Unnamed		0– 55	Unconsolidated fine- to medium-grained sand and blue-gray to tan clay. Commonly contains peaty organic material.	Surficial aquifer	Water mainly unconfined. Locally includes upper part of Hawthorn Formation. Tapped by shallow wells for domestic supply.
	Tertiary	Pliocene							
		Miocene	Duck Lakian	Hawthorn Formation		0–185	Unconsolidated medium-grained sands and clays; poorly to well consolidated limestones and sandy limestones. Green to brown. All rock types phosphatic.	Hawthorn confining unit	Retards vertical movement of water because of comparatively low permeability. Locally yields water under confined conditions from middle part. Lower part, where permeable, forms part of Floridan aquifer.
		Oligocene	Anahuachian to Vicksburgian	Suwannee Limestone		0–110	Limestone, white to cream to tan. Dolomitic or cherty in places. Usually fossiliferous. Not encountered in Osceola National Forest drilling.	Floridan aquifer	Principal aquifer in Florida and southeast Georgia. Yields large quantities of water under confined conditions in most places. Can be divided into zones or sub-units in places because individual beds vary greatly in permeability and vertical hydraulic connection. Lower part contains salty water almost everywhere. Thickness of freshwater-bearing part variable. Contains karst features where not covered by Miocene rocks.
		Eocene	Jacksonian	*Ocala Limestone		120–390	White to cream coquina in upper part. Gray, fossiliferous fine crystalline to granular limestone below. Minor brown dolomite and green clay.		
			Claibornian	Avon Park Limestone Lake City Limestone		500–860	Limestone, tan to cream, microcrystalline to chalky. Interbedded, dark brown, coarse crystalline dolomite prominent. Limestones fossiliferous. Contains some chert, gypsum, and glauconite.		
			Sabinian	Oldsmar Limestone		270–490	Limestone, cream, light-gray, or dark-gray, microcrystalline to pelletal. Dolomite, chert prominent. Slightly glauconitic.		
		Paleocene	Midwayan	Cedar Keys Limestone		320–500	Limestone, tan to gray, medium to coarse crystalline, porous, vuggy. Highly gypsiferous and anhydritic. Brown porous dolomite prominent.		
Mesozoic	Cretaceous	Gulfian	Navarroan	Lawson Limestone		95–340	Dolomite, tan to gray, medium crystalline, porous. Coarse crystalline porous limestone prominent. Large Foraminifera, gypsum common.	Unnamed confining units and aquifers	Predominantly impermeable strata with a few beds of low permeability. Permeable units contain saltwater everywhere.
			Tayloran	Unnamed		285–740	Chalk, white, massive. Contains thin beds of brown dolomite. Good planktonic foraminiferal microfauna.		
			Austinian	Unnamed		285–510	Argillaceous chalk in upper part. Calcareous gray-white to brown-white, thinly laminated shale in lower part. Shale commonly ashy. Planktonic Foraminifera common.		
			Eaglefordian	Atkinson Formation	Upper	0–185	Shale, gray-green, sandy, commonly micaceous, with fish scales common. Interbedded with light-gray fine-grained sandstone.		
			Woodbinian		Lower	0–140	Sandstone, green to gray to brown, fine- to medium-grained, contains sausserite. Minor gray shale.		
		Comanchean	Washitan	Unnamed		0–245	Sand, well to poorly consolidated, medium- to coarse-grained, yellow, red, orange, and brown. Minor red to purple shale.		
			Fredericksburgian	Unnamed		0–160	Sandstone, white, coarse-grained, conglomeratic. Minor red shale.		
	Triassic (?)			Unnamed		0– 25	Diabase sill occurring in Paleozoic strata.		
Paleozoic	Silurian			Unnamed		Greater than 1998	Predominantly black fissile shale with highly micaceous partings. Thin beds of white sedimentary quartzite common. Quartzite commonly stained red to purple. Total thickness unknown.		
	Ordovician								

*The Ocala Limestone is divided into 3 formations by the Florida Bureau of Geology: Inglis, Williston, and Crystal River.

From GS WRI 78-6, pg. 11.



EXPLANATION

------ **BOUNDARY OF OSCEOLA NATIONAL FOREST**

SERIES	STAGE	FORMATION & MEMBER	
HOLOCENE AND PLEISTOCENE		Several lower marine and estuarine terrace deposits	▧
MIOCENE	CHOCTAWHATCHEE	Miccosukee Formation*	○
		Charlton Formation*	▩
		Jackson Bluff Formation*	
		Yellow River Formation	▨
	?	Alachua Formation*	⁘
	ALUM BLUFF	Fort Preston Formation	░
		Hawthorn Formation*	▒
OLIGOCENE		Suwannee Limestone*	▨
EOCENE	JACKSON*	Crystal River Formation	⁙
		Williston Formation	▨
		Inglis Formation	▓
	CLAIBORNE*	Avon Park Limestone*	▦

Stage, formation, and member terminology is that used by the Florida Bureau of Geology. The U.S. Geological Survey recognizes those units marked with an asterisk, but the Charlton, Jackson Bluff, and Alachua Formations are considered Pliocene age.

Figure 5. Geologic Map of Northeast Florida

From GS WRI 78-6, pg. 12.

phate in the hard-rock deposits is the result of partial or complete replacement of limestone by downward-percolating phosphate-rich ground water. The enriched limestone was subsequently eroded and redeposited as large clasts in topographic depressions on an older limestone surface.

Fig. 6 shows the locations of the known Florida phosphate deposits relative to structural features in the State.

b. Oil and Gas (No change)

c. Construction Minerals (No change)

d. Uranium (Replaces original section, pg. II-8)

Naturally occurring radionuclides, such as uranium, thorium, and their decay products, are present throughout the environment. However, phosphate deposits in central Florida contain significantly elevated uranium and decay product levels—some 30-60 times those found in average soil or rock. It is a constituent throughout the deposits, from pebble-size phosphate to colloidal phosphate. The matrix in central Florida contains .01 to .02 percent uranium (Preliminary Findings: Radon Daughter Levels in Structures Constructed on Reclaimed Florida Phosphate Land, Technical Note, ORP/CDS-75-4. U.S. Environmental Protection Agency, September 1975). The matrix in north Florida contains 20 to 25 percent of the amount of uranium found in central Florida (Roessler, C.E., Z.H. Smith, W.E. Bolch and R.J. Prince (1977), Uranium and Radium-226 in Florida Phosphate Materials; Report to the Florida Phosphate Council. University of Florida, December 1977). This calculates to approximately .003 to .005 percent uranium for north Florida. It has been shown that the radioactive decay products, at least through radium 226, are in equilibrium with the uranium in the phosphate deposits.

A detailed description of the existing radiological environment may be found in the Environmental Protection Agency Final Environmental Impact Statement EPA 904/9-78-020, September 1978, Occidential Chemical Company, Swift Creek Chemical Complex, Hamilton County, Florida, Companion Summary Document, pp. 103-120. This complex is located approximately twenty miles west of the Osceola and it is expected that the natural background radiation environment is very similar to that found on the Forest.

3. General Soil and Vegetation Associations (No change)

4. Water Resources

a. Watershed

Basin Hierarchy (Replaces discussion, pp. II-9—II-10 only, and adds Table 3)

The Osceola National Forest lies within the Suwannee and St. Marys River basins. The four Forest streams that lie within the lease application area are Deep Creek, Robinson Creek, Falling Creek (Suwannee Basin), and Middle Prong St. Marys (St. Marys Basin). An insignificant amount of the lease application area lies within the Olustee Creek drainage of the Santa Fe River Basin. Falling Creek at normal flow terminates in a sinkhole 4 miles west of the Forest boundary.

The Suwannee River has been recommended for inclusion in the National Wild and Scenic River System.

The Forest drainage basins and acreages are shown in Table 3. The regional basin maps are shown in Int. FES 74-37, pp. II-11 and II-12, Figs. 15 and 16.

Topography and Drainage (No change)

Coastal Lowlands (No change)

Swamps (No change)

Lakes and Springs (Adds new material to original section, pg. II-14)

There are no known sinkholes within the lease application area. However, two small circular ponds, Ocean Pond, and a few swampy areas within the Forest are probably of solution-related origin, and suggest that sinkholes may be present.

The north portion of Watertown Lake, less than 20% of the total area of the lake, is the only area of lake within the lease application area.

Fig. 7 illustrates the relationship between the lease application areas and the drainage basins of the Forest.

b. Surface Hydrology

Streamflow Characteristics (Replaces "Streamflow—ungauged streams"and "Flow Characteristics"and footnotes, pp. II-14--II-16)

The surface drainage is not well defined and stream channels are shallow with sluggish flows. Streamflow varies greatly in direct response to rainfall. Often, land features are flooded and ditches are required to collect and drain Forest roads and facilities. Of the streams draining the Forest, the Middle Prong St. Marys at Taylor has the most complete long-term record of streamflow (1955-1967). The monthly average flow of the river varied from less than one to more than 900 cfs (cubic feet per second) while the monthly rainfall at Lake City varied from near zero to 15 inches. Variations in discharge during the falling river stage lag behind those of rainfall by approximately one month. This lag is due presumably to basin storage. The average longterm

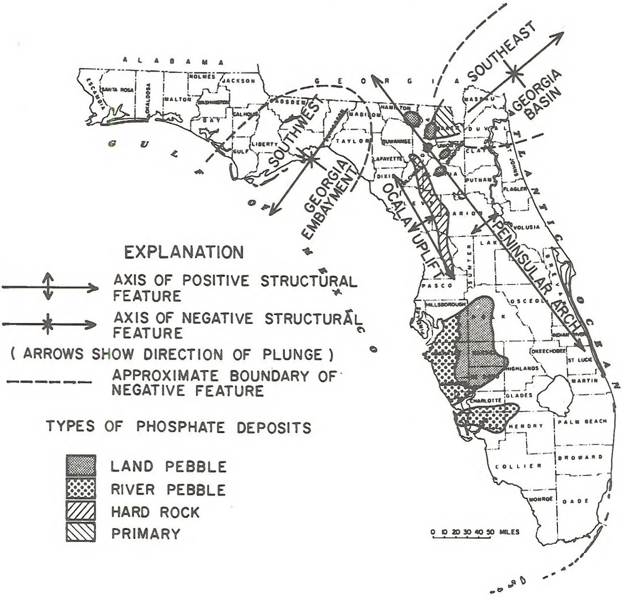


Figure 6. Structural Features and Generalized Phosphate Distribution in Florida.
(Phosphate Information After British Sulphur Corporation, 1961)

From GS WRI 78-6, pg. 13.

TABLE 3--Drainage Basins Within Osceola National Forest [1]

Map [2] Number	Drainage Basin	Acres	Square Miles	Percent of Total Forest
	SUWANNEE RIVER BASIN			43.1
I	Deep Creek	41,990	65.61	25.4
II	Robinson Creek	13,325	20.82	8.1
III	Falling Creek	15,795	24.68	9.6
	ST. MARYS RIVER BASIN			54.8
IV	Middle Prong St. Marys	77,427	120.98	47.0
V	Cedar Creek	10,579	16.53	6.4
VI	Bluff Creek	1,818	2.84	1.1
VII	South Prong St. Marys	550	.86	.3
	SANTA FE RIVER BASIN			2.1
VIII	Olustee Creek	3,430	5.36	2.1
	TOTAL	164,914	257.68	100.0

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[1] From GS WRI 78-6 pg. 50. Drainage areas were determined with Geological Survey topographic maps.

[2] See Fig. 7.

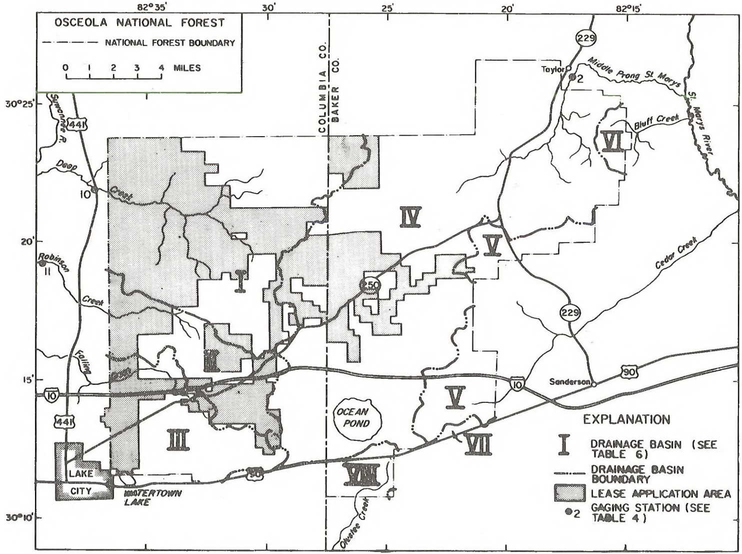

Figure 7. Drainage Basins and Phosphate Lease Application Areas Within Osceola National Forest, and Three Gauging Stations Used for This Study. From GS WRI 78-6, pg. 49.

yearly discharge of the Middle Prong St. Marys River is approximately 100 cfs, equivalent to 0.8 cfs per square mile of the drainage basin.

Deep Creek and Robinson Creek seasonal flow patterns are similar to those of Middle Prong St. Marys, as shown in Figure 8; streamflow rises sharply in response to rainfall, and then gradually tapers off after rainfall ceases. There are no daily flow data available for Falling Creek, but its flow pattern is assumed to approximate that of the adjacent Robinson Creek. The two streams are similar in basin size and characteristics.

The Geological Survey (GS) measured streamflow on three streams draining the Forest from April 1976 through January 1977. Based upon GS data, the estimated (weighted by area) average annual discharge from the forest area of the Deep Creek, Robinson Creek, Falling Creek and Middle Prong St. Marys drainage basins is slightly less than 1.0 cfs per square mile, or about 11 to 13 inches, per year.

The flow direction varies over much of the flat terrain of the Forest, and is dependent upon prevailing moisture conditions and rainfall patterns. Accordingly, during low rainfall periods the water flow may be in one direction, and at high or flood flows it may be in the opposite direction. Thus, at flood stage, interbasin transfer of water may occur between watersheds.

Low flows are influenced by the subtle supply of water from various swamps and bays. The latter act as "reservoirs"which, along with ground water discharge to the stream courses, tend to prolong stream flow at lower elevations. All of the smaller streams in the National Forest are intermittent. Robinson Creek and Falling Creek have had zero flows recorded at the gaging station sites. Low flow periods normally occur from November through February, but may occur anytime during prolonged droughts.

Floods are an almost annual occurrence. The magnitude and recurrence of floods can be predicted with fair dependability from established, long-term stations within the same hydrologic province. Data from Pride (Fig. 9) show the variation of flood discharge by drainage area for particular flood recurrence intervals from the "mean annual"through the 50-year flood (Pride, R.W., 1958. Interim Report on Surface Water Resources of Baker County, Florida. State of Florida Geological Survey, Information Circular 20).

Fig. 9 indicates, for example, that Deep Creek produces a mean annual flood of 1,600 cfs, and a 50-year flood event of up to 5,600 cfs. At flood periods the soils are saturated, i.e., water tables are high and soil moisture has steadily increased due to a few days of rain before the main storm cell enters the area. Because the soils are in this condition, little or no additional water can be stored, and thus new rainfall immediately runs off as streamflow (flood flow).

At any time of the year, flood flows can occur as a result of normal "wet"periods, hurricanes, or massive storm fronts (tornadoes, convectional storms, etc.). Flood flows occur almost every year from September through April.

In general, the peak flows per unit drainage area for Deep Creek and Robinson Creek are larger than those of Middle Prong St. Marys. This is due, presumably, to the difference in basin slopes. Robinson Creek has an average slope of 5 feet/mile, compared to 3 feet/mile for Middle Prong St. Marys River. The basin slope of Deep Creek is between those of the above streams. (In the western part of the Forest, however, the slope for Deep Creek approximates the slope of Robinson Creek.) Because the slope of Deep Creek basin is generally "intermediate"by comparison, higher unit area flood flows can be expected for Robinson Creek than for Deep Creek basin. By the same reasoning, unit area flood flows for Middle Prong St. Marys can be expected to be lower than those for Deep Creek basin.

Flood prone maps have been finalized for the Forest and the adjacent area (and obtained from Geological Survey, Water Resources Division, Tallahassee, Florida). No observed changes have been made from the preliminary maps (see maps in FES, pp. XI-8 through XI-20). These maps indicate a significant amount of land surface will be inundated by a 100-year flood event. Floods must be considered in management planning of private lands and the Osceola National Forest. For example, the 100-year flood could inundate approximately 90% of the Deep Creek drainage basin in the Forest.

Lake Evaporation (Replaces the last two paragraphs of the original text, pg. II-16)

Available regional data indicate that the average annual lake evaporation is about 46 inches (GS WRI 78-6, pg. 17).

Evapotranspiration (Entirely new material)

Evapotranspiration rates have not been measured in the Forest. However, estimates for large basins indicate a range from 35 (Silver Springs Basin) to 42.5 in./yr. (Kissimmee River Basin). It is estimated that the evapotranspiration rate for the Forest lies within these values (GS WRI 78-6, pg. 17). A value of 40 in./yr. is used in this supplement.

c. Water Quality and Water Usage

Water Quality (Adds new material to original text, pp. II-16—II-19)

A summary of chemical and physical analyses of water from streams draining the Osceola during the short-term period of study (April 1976 to March 1977) is given in GS WRI 78-6, pp. 57-60.

The surface-water quality is similar among the Forest streams. Minor variations in quality occur within the watersheds due to contributions from ponds, bays and other surface features. The range of values indicates the influence of seasonal and flow variations.

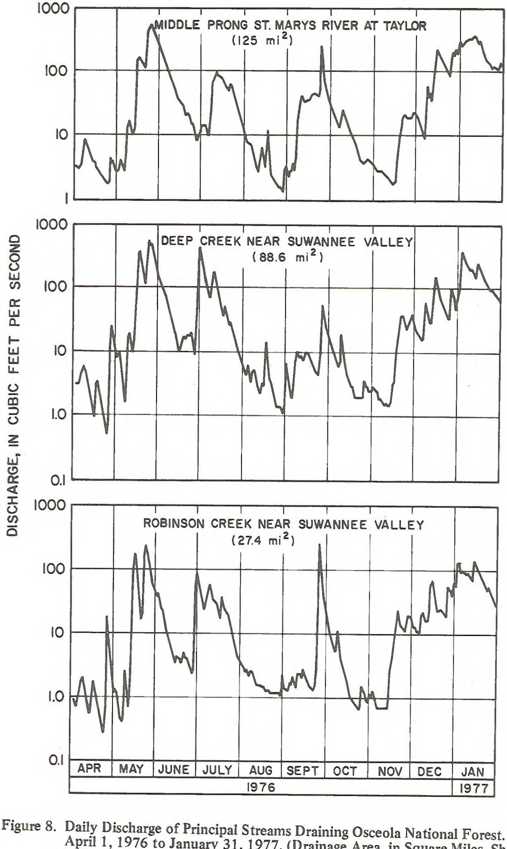

Figure 8. Daily Discharge of Principal Streams Draining Osceola National Forest. April 1, 1976 to January 31, 1977. (Drainage Area, in Square Miles, Shown in Parentheses). From GS WRI 78-6, Pg. 54

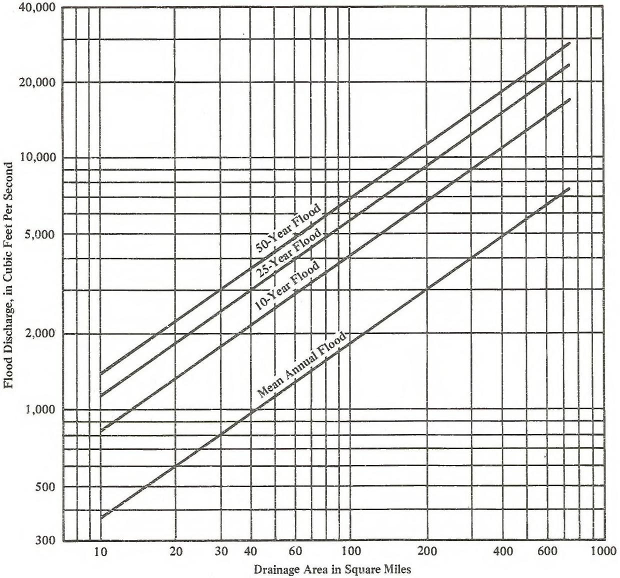

Figure 9. Flood Discharge by Drainage Area

Stream quality (dissolved inorganic solids) is similar to ground water quality in the surficial ("non artesian") aquifer, especially at low flow periods, because the surface waters come primarily from the surficial aquifer. During high flows, the dissolved solids concentration is lower than that of the surficial aquifer (which remains nearly constant) because the flow is derived primarily from surface and near surface sources. Dissolved organic concentrations are approximately equal to dissolved inorganic constituents for surface streams, for median flows.

Those dissolved water quality constituents for the Forest streams which typically would be associated with, or influenced by, phosphate operations, were determined by collecting 12 to 14 samples from three Forest streams at the continuous-recording stream-gauging stations (GS WRI 78-6, page 61):

—Total phosphorus (as P) varied in concentration from 0.01-0.33 mg/L. Concentrations decreased slightly with increased streamflow.

—Total nitrogen (primarily organic as N) varied in concentration from 0.55-1.3 mg/L.

—Sulfate varied in concentration from 0.2-13 mg/L.

—Fluoride varied in concentration from 0-0.3 mg/L.

—Total organic carbon and tannins-lignins concentrations are similar for each Forest stream. Total organic carbon varied in concentration from 16-50 mg/L. The pH decreased with an increase in organic carbon content. Tannins and lignins ranged in concentration from 1.2-13 mg/L.

—pH varied from 3.1-7.1 with a median value of 5.0. The pH decreased during higher flows with an increase in organic carbon content.

—Radium-226 varied in concentration from 0.01-0.20 pCi/L and did not relate to streamflow for the observations completed to date (1977).

Suspended sediment concentrations were less than 8 mg/L, indicating that the well-forested, relatively flat, sandy watersheds are in excellent watershed condition, with suspended sediment averaging only 0.01 tons/day per square mile.

Dissolved solid loads (residue) for the Forest streams contribute more than 95% of the total stream loads, and vary due to differences in the mean discharges for each stream. Dissolved solid loads for Robinson Creek, Deep Creek and Middle Prong St. Marys measured 0.24, 0.17, and 0.12 tons/day per square mile, respectively.

Generally, constituent concentrations are higher for the western portion of the Forest (Deep Creek and Robinson Creek) than for the eastern portion (Middle Prong St. Marys).

Water Usage (Adds new material to original text, pg. II-19)

Daily water use for Baker, Columbia, Hamilton and Suwannee Counties for 1975 is shown in Table 4. The table reveals that a significant amount of ground water usage (30.3 million gallons per day or 92% of all ground water withdrawn) in Hamilton County is devoted to industry—primarily for phosphate operations. The most significant use of water in Columbia County is for irrigation (10.8 million gallons per day, or 76% of all ground water withdrawals).

Total daily consumption for Lake City in 1975 was approximately 120 gallons per person, amounting to approximately 12% of the total Columbia County ground water withdrawal.

d. Ground Water (Replaces entire original section, pp. II-19—II-22)

Geology (Hydrogeologic Units)

An extensive discussion of the geology and stratigraphy of the Forest and adjacent area is contained in GS WRI 78-6, pp. 10-14 and 39-48. The Forest ground water system, in descending order, consists of the unconfined surficial aquifer, the Hawthorn confining unit, and the confined Floridan aquifer (see Table 5). Member (i.e., Geologic Unit) A of the upper portion of the Hawthorn contains the phosphatic matrix and is within the surficial aquifer. Members B, C, D, and E comprise the Hawthorn confining unit, which hydraulically separates the surficial aquifer from the Floridan aquifer. The Floridan aquifer is the primary source of water for industrial, agricultural, and domestic use in the area.

Surficial Aquifer (Water Table)

The upper part of the surficial aquifer consists of unconsolidated fine- to medium-grained sands and minor amounts of clay and peat. Member A (Hawthorn) lies beneath this unit and is in the lower part of the surficial aquifer. It consists of clayey sands, argillaceous limestone, and poorly sorted phosphatic sands, including the ore matrix.

The surficial aquifer ranges in thickness from 42 feet near Lake City to 156 feet near Taylor (see Fig. 10).

The aquifer is unconfined, and the water table rises rapidly during periods of rainfall and declines gradually during droughts. Seasonal fluctuations are usually 3-4 feet. The water table is at or near the land surface and conforms generally (subdued) to the surface topography (see Fig. 11). The water levels in the surficial aquifer everywhere in the Forest are at higher altitudes than the potentiometric surface of either the Floridan aquifer or the Hawthorn confining unit.

Discharge from this aquifer results from evaporation, transpiration by plants, seepage into streams, swamps, and lakes, leakage to the underlying formations, and pumpage from a few wells.

The water in the surficial aquifer generally moves northerly from the topographic high that extends eastward from Lake City (see Fig. 11).

Water quality varies vertically within the aquifer due to differences in lithologic units. The water in the upper portion (post-Miocene) has a pH ranging from 4.5-6.2, specific conductance ranging from 50-84 umhos/cm, and dissolved solids (sum) concentrations ranging from 32-46 mg/L. No major ions dominate the water quality charac-

TABLE 4-- Water Use During 1975 in Baker, Columbia, Hamilton, and Suwannee Counties, Florida (After Leach, 1977)

(All Values in Millions of Gallons Per Day.
GW, Ground Water -- SW, Surface Water)

	MUNICIPAL						RURAL			INDUSTRY		IRRIGATION		
	Withdrawn		Delivered				Withdrawn			Withdrawn		Acres Irrigated	Withdrawn	
			Public Supply	Industry	Commercial	Air Cond.	Domestic	Livestock						
County	GW	SW					GW	GW	SW	GW	SW		GW	SW
Baker	0.54	0	0.46	0	0.08	0	0.82	0.88	0.05	0.32	0	60	0.00	0.67
Columbia	1.70	0	1.04	.17	.41	.08	1.33	.27	.17	.12	0	61,080	10.75	1.19
Hamilton	.60	0	.53	.02	.05	0	.28	.41	.07	30.30	[1] 0	3,580	1.34	.15
Suwannee	1.13	0	.86	.04	.21	0	.99	.53	.02	2.39	0	3,990	1.42	0
Totals	3.97	0	2.89	.23	.75	.08	3.42	2.09	.31	33.13	[1] 0	68,710	13.51	2.01

[1] 305 Mgal/d recycled through settling ponds and hydraulic system of phosphate industry operations.

From GS WRI 78-6, pg. 8.

TABLE 5-- Generalized Description of Hydrogeologic Units in Osceola National Forest

Hydrogeologic Unit	Water Bearing Properties	Geologic Unit		Age	Thickness (feet)	Lithology
Surficial aquifer	Water unconfined. Readily absorbs and stores precipitation until water table rises to land surface. Principal source of baseflow to streams draining forest. Uppermost member of Hawthorn Formation is hydraulically continuous with surficial deposits and forms lower part of surficial aquifer.	Unnamed		Post-Miocene	6-54	Medium-grained sand and blue-gray sandy clay. Local peat layers.
		A	Hawthorn Formation	Miocene	15-102	Brown phosphatic sand, yellow-brown to blue-gray clay, gray phosphatic shell limestone. Limestone more prominent in western part of forest.
Hawthorn confining unit	Because of comparatively low permeability, most of unit acts to retard the downward movement of water from the surficial aquifer to the Floridan aquifer. Member C yields small quantities of water under confined conditions. Basal limestone beds are not considered part of the Floridan aquifer in the Forest.	B			13-70	Green to greenish-gray massive clay. Often fractured. Black clay prominent.
		C			13-58	Green to greenish-gray fine- to medium grained sand. Contains clay and limestone to east of forest.
		D			5-43	Complexly interbedded shell limestone, clay, clayey sand, and fine-grained sandstone.
		E			14-73	Brown sandstone, tan to dark-brown limestone, dolomite, and argillaceous limestone. Fossiliferous, well indurated.
Floridan aquifer	Yields large quantities of water under confined conditions everywhere under Osceola National Forest.	Ocala* Limestone		Eocene	102+	White calcarenite at top, containing some green clay. Gray hard fractured limestone below. Penetrated 102 feet.

*The Suwannee Limestone of Oligocene age, which is part of the Floridan aquifer in places, was not found in the Osceola National Forest.

From GS WRI 78-6, pg. 64.

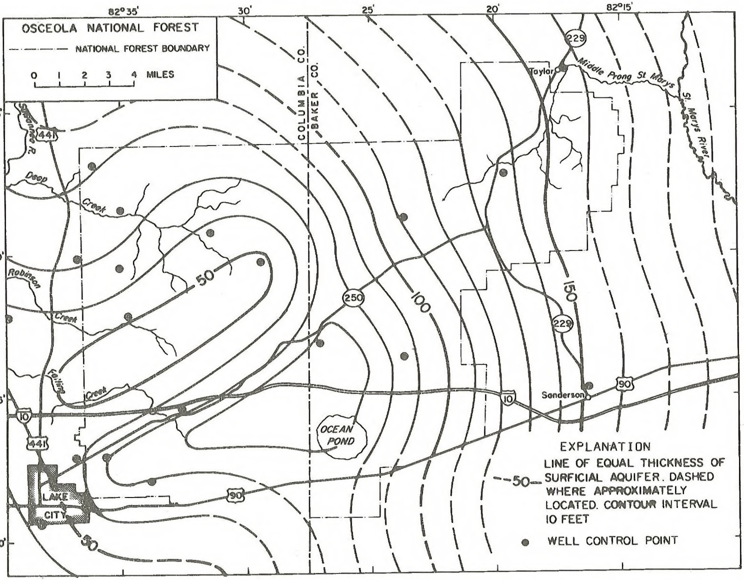

Figure 10. Thickness of the Surficial Aquifer in Osceola National Forest

From GS WRI 78-6, pg. 66.

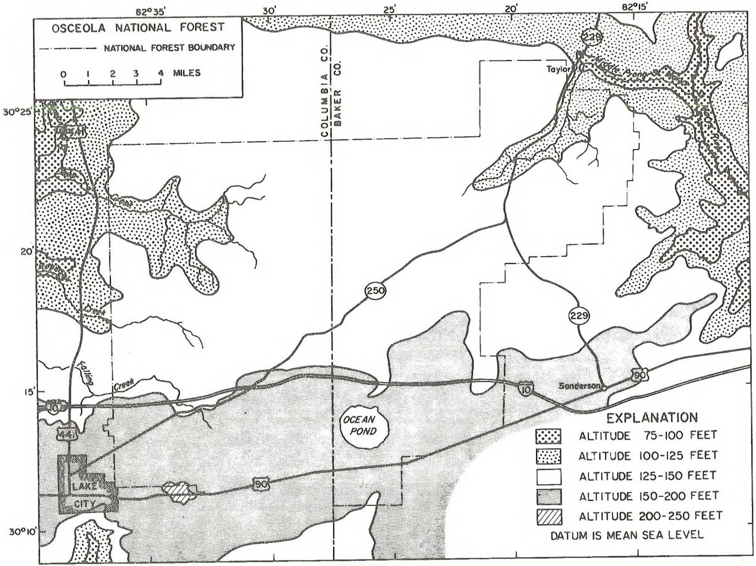

Figure 11. Generalized Configuration of the Water Table in Osceola National Forest
(Altitudes from U.S. Geol. Survey 1:24,000 Topographic Map Series)

From GS WRI 78-6, pg. 67.

teristics. Organic material occurs in water from some shallow wells. The upper portion of the member A unit is high in total phosphorus (2.2 mg/L) and fluoride (0.5-0.6 mg/L) concentrations, which indicates the phosphatic zone. The pH in this unit varies from 5.9-6.4. Water quality data for individual wells are shown in GS WRI 78-6, Table 10, pg. 70.

Radionuclides and trace elements are low in concentration (see GS WRI 78-6, Table 11, pg. 71).

Hawthorn Confining Unit

Hawthorn members B, C, D, and E comprise the Hawthorn confining unit, which everywhere underlies the surficial aquifer and consists generally of clay, sandy clay, fine-grained sandstone and sandy to argillaceous limestone. Except for the moderately permeable member C, this unit has low permeability and restricts the downward movement of water to the underlying Floridan aquifer.

The thickness of the Hawthorn confining unit varies from 52 feet near Lake City to 234 feet near Taylor (see Fig. 12). The Suwannee River cuts through the unit to the Floridan aquifer west of the Forest.

Altitudes of the potentiometric surface of water in the Hawthorn are about 40 ft. below the surficial water table and about 40 ft. above the potentiometric surface of the Floridan aquifer. The downward hydraulic gradient indicates that some water from the surficial aquifer leaks through the confining unit to the Floridan aquifer. Recharge response to this unit is similar to that of the Floridan aquifer, but the annual fluctuation of water levels is only 3 ft., compared to 9 ft. for the Floridan aquifer. The Hawthorn unit yields only 2-3 gallons per minute and is not a reliable source of water supply, except for small domestic wells.

The water quality of wells tapping this unit is shown in GS WRI 78-6, Tables 13 and 14, pp. 77-78. Notably, Radium-226 (Ra-226) concentrations are approximately 4 times higher than for water in the surficial aquifer. Water chemistry of the unit is similar to that of Member A of the surficial aquifer (a "calcium-magnesium-bicarbonate"-type).

Floridan Aquifer

The Floridan aquifer underlies the Hawthorn unit and consists of thick and extensive series of interbedded limestones and dolomites, which vary vertically and horizontally in porosity and permeability.

The Floridan aquifer is at or near the land surface in the southwestern parts of Columbia and Hamilton Counties and in western Suwannee County. A thin veneer of sediments of the surficial aquifer cover the Floridan at these locations. Within the Forest, however, the Hawthorn confining unit everywhere overlies the Floridan aquifer and separates the surficial and Floridan aquifers.

The thickness of the Floridan aquifer beneath the Forest can be as much as 1,750 feet, but the freshwater-bearing portion is only 800-1,000 feet thick. Generally, large wells can yield 1,000 gals./minute or more.

Floridan Ground Water Movement and Recharge

A potentiometric high exists northeast of Lake City, and ground water moves both toward Lake City and generally northeast to east across the Forest (see Figs. 13 and 14). This high probably is due to the direct recharge of surface water from Falling Creek via sinkholes that breach the Hawthorn. Another source of recharge is the movement of water through the veneer of sediments above the Floridan aquifer southwest of the Forest. The flow of Falling Creek terminates during normal flow in a sinkhole 4 miles west of the Forest. Some recharge of the Floridan occurs by leakage from the surficial aquifer. Major fluctuations of water levels occur due to variations in rainfall, evapotranspiration and recharge. Wells generally are at their highest level from December through February and at their lowest from August through October. The Floridan water levels fluctuate more widely than do those of the surficial aquifer and the Hawthorn unit.

Floridan water levels near the Forest are related to the stages of the Suwannee River. The magnitude of ground water level rise at times of high stream stage decreases progressively eastward from the river. The Suwannee River stage is almost always higher than the ground water levels in the aquifer in the northern part of the Forest (see Fig. 15). For most of the year, the ground water levels southeast of the Suwannee River near Lake City are higher than the river stage. This suggests that part of the Floridan recharge from the capture of Falling Creek is discharged to the Suwannee River (GS WRI 78-6, pg. 83). Water level-data for December 1976 and January 1977 indicate that when the Suwannee River is at high stages, ground-water discharge from the Floridan aquifer to the river is arrested and the flow is reversed. Accordingly, streamflow recharges the aquifer during this period.

Floridan water quality for two Forest wells is indicated in Int. FES 74-37, Table 3, pg. II-19. Additional data from wells penetrating the uppermost portion of the aquifer have been collected (GS WRI 78-6, Tables 15-16, pp. 87-88). Generally, specific conductance ranges from 361-508 umhos/cm, dissolved solids from 232-329 mg/L, pH from 7.2-7.8, fluoride from 0.2-0.6 mg/L, total phosphorus (as P) up to 0.05 mg/L, total nitrogen (as N) from 0.01-0.36 mg/L, and radium-226 from 0.6-5.2 pCi/L. The water is of the "calcium-magnesium-bicarbonate"type.

Water quality in the Floridan aquifer within the Forest results from the mixing of water from upgradient sources and from leakage from overlying strata. Water from overlying strata (Hawthorn) is slightly more mineralized that the water from lateral upgradient sources. Leakage from the Hawthorn probably does not greatly affect the Floridan water quality (GS WRI 78-6, pg. 86). The Floridan water quality is fairly consistent areally and with

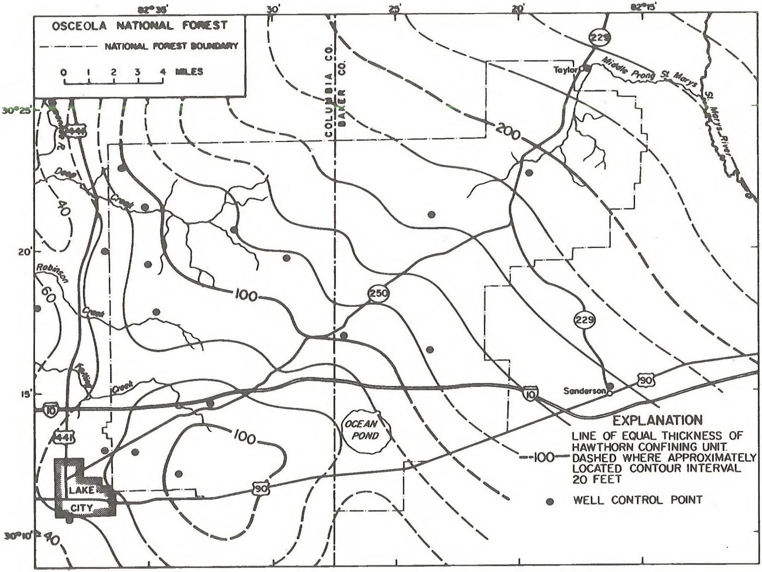

Figure 12. Thickness of the Hawthorn Confining Unit in Osceola National Forest

From GS WRI 78-6, pg. 73.

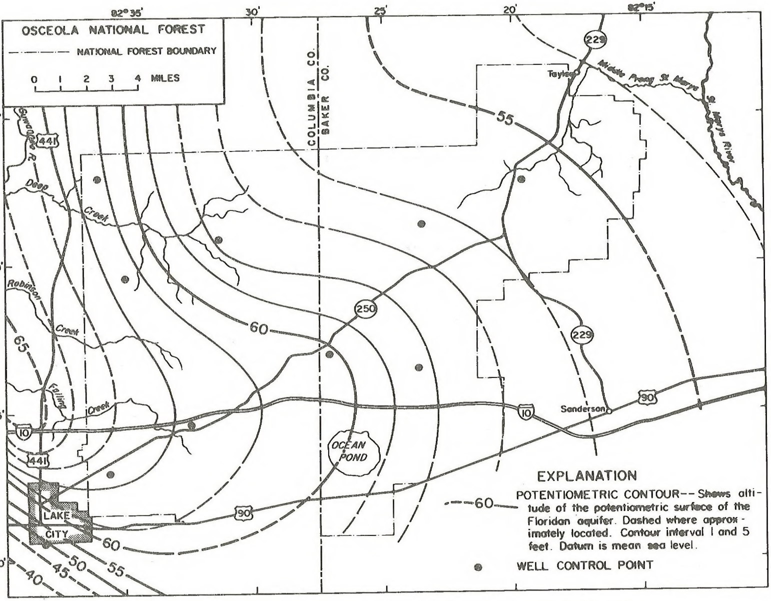

Figure 13. Potentiometric Surface of the Floridan Aquifer, January 15, 1977

From GS WRI 78-6, pg. 80.

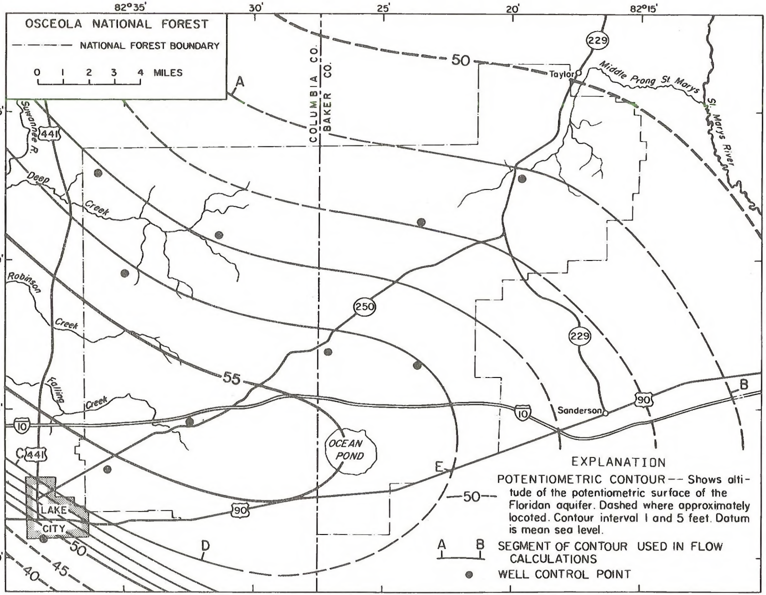

Figure 14. Potentiometric Surface of the Floridan Aquifer, November 10, 1976

From GS WRI 78-6, pg. 81.

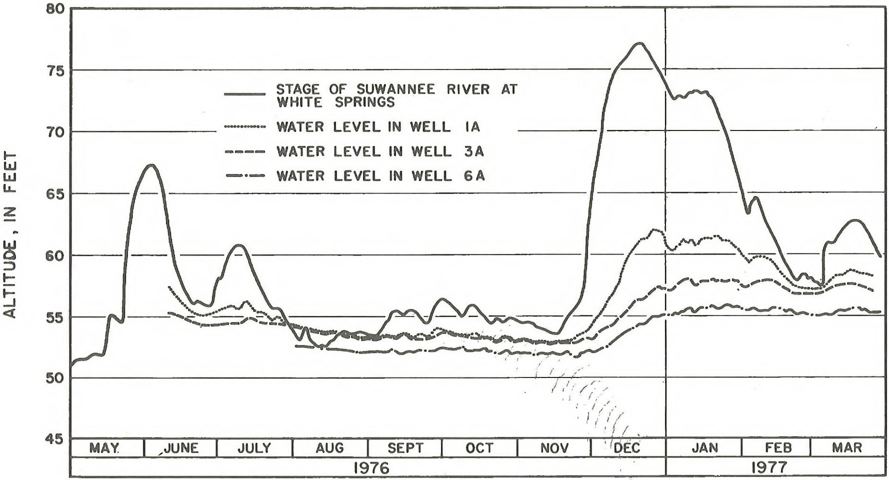

Figure 15. Comparison of Stage of Suwannee River with Water Levels in Three Wells Tapping the Floridan Aquifer in Osceola National Forest

From GS WRI 78-6, pg. 85.

time, except in three instances: (1) where the aquifer is recharged directly by surface inflow (as is the case along Falling Creek and along the Suwannee downstream from White Springs); (2) where gypsum or anhydrite deposits locally enrich the ground water; and (3) where lowering of the fresh water head may have caused upward movement of saline water.

Aquifer Tests

The Geological Survey conducted aquifer tests to determine the hydraulic properties of the underlying hydrogeologic units in the Forest. The data indicate that at site 2 A, B (see Fig. 16), "the potential for vertical leakage into the Floridan aquifer of water that might be contaminated by phosphate industry operations was considered greater than at any other site test-drilled within phosphate lease application areas"(GS WRI 78-6, pg. 89).

"Aquifer tests show that member C, the most permeable part of the Hawthorn Confining Unit, has a transmissivity of 15 ft^2/d, a storage coefficient of $1.2\text{x}10^{-4}$, and a hydraulic conductivity of 0.75 ft/d—a value that indicates a poor aquifer. The upper part of the Floridan aquifer has a transmissivity of 33,000 ft^2/d, based on aquifer test results. This figure is probably low because only the upper part of the aquifer was penetrated by the wells used for aquifer testing. Based on available data for the Floridan from areas surrounding the Forest, the actual transmissivity of the aquifer is estimated to be 66,000 ft^2/d" (GS WRI 78-6, pg. 152).

A water budget analysis (an inflow and outflow accounting of water) was also done to account for downward movement of water to the Floridan aquifer within the Forest (GS WRI 78-6, pg. 96). "The calculated water budget for the Forest shows a residual from 0 to 4 inches of water per year available for recharge to the Floridan aquifer" (GS WRI 78-6, pg. 151)

The "lower end"of the estimate (near one inch) approximates the ground water flow calculations.

5. Climate and Air Quality (No change)

B. LIVING COMPONENTS

1. Vegetation

(Replaces the entire section, pp. II-29—II-39, with the exception of the first four paragraphs of the original section.)

In general, vegetation on the Osceola National Forest consists of three types, categorized in the FES as pine flatwoods, cypress swamps and creek swamps. The FWS Report (Mar. 78) uses a different system of nomenclature and further subdivides the three vegetative types into subcategories as indicated in Table 6.

The vegetative types are described in FWS Report (Mar. 78) as follows (see Figs. 17a-17h). Scientific names for these plant species are listed in the FWS report.

Pineland Systems

High Pineland

High pineland in Florida consists primarily of a longleaf pine canopy with scattered turkey oaks and a virtually continuous ground cover of grasses, predominantly wiregrass. Very little of this type still exists in Florida.

Two phases of high pineland are found in the Osceola: the turkey oaks phase and the old field phase. The turkey oak phase is the more abundant (700 acres (57%) out of a total of 1,225 classified as high pineland). The subcanopy generally consists of turkey oak, 2 to 5 meters (6 to 16 ft.) tall. The type is relatively open with the oaks arranged in clumped stands. Ground cover usually consists of mixed grass species and a number of species of annuals. Soils are well-drained sands and areas of the ground are frequently bare of any vegetation. The oaks present are not necessarily limited to turkey oak: bluejack oak, post oak, and water oak are also present in some stands. The shrub layer is poorly developed; when present it usually consists chiefly of pawpaw. Saw palmetto is usually present also, but cover value is never greater than 25%. The vegetative components of the ground layer may include runner oak, some wiregrass, elephant's foot, rabbit tobacco, shiny blueberry, and a number of annuals. The composition and total cover of these ground layer plants can be extremely variable.

The old field phase comprises 525 acres (43%) of the total high pineland type. Old fields are characterized by relatively dry, sandy soils that are grassy in cover, but lack wiregrass and turkey oaks. Trees, when present, consist of slash pine or longleaf pine. Scattered evergreen oaks such as sand live oak and laurel oak make up the subcanopy of the old field phase. The shrub layer consists of young evergreen oaks and variable numbers of American holly, pawpaw, deerberry, and wax myrtle. Dog fennel, broomstraw, and other grasses make up the ground layer.

Pine-Palmetto Flatwoods (Pine Flatwoods)

Pine-palmetto flatwoods constitute the major type in the Osceola, covering some 105,962 acres, or 67% of the total Forest.

Four phases of pine-palmetto flatwoods are recognized: (1) longleaf pine phase (26,195 acres); (2) slash pine phase (74,043 acres); (3) longleaf-slash pine phase (5,724 acres); and (4) pond pine phase (small acreages). The pineland systems within the Osceola National Forest actually form a continuum from the very well-drained high pineland to the poorly-drained flatwoods. The differentiation between the longleaf, the slash and the longleaf-slash phases is also somewhat arbitrary, and is based

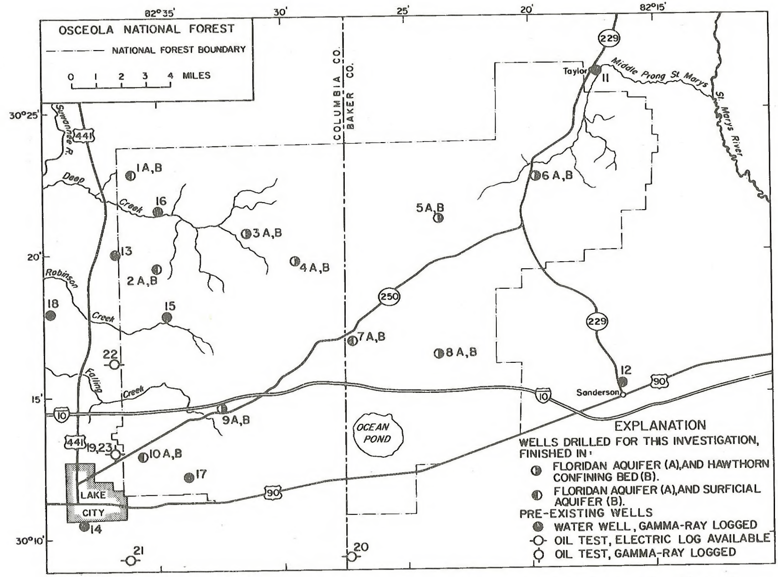

Figure 16. Location of Wells from Which Hydrologic, Geologic, and Geophysical Data Were Obtained

From GS WRI 78-6, pg. 34.

TABLE 6--Vegetative Types on the Osceola National Forest

Vegetative Type	Acres of Veg. Type in ONF	Percent of Veg. Type within ONF	Acres of Veg. Type within Lease Applic. Area	Percent of Total Veg. Type within Lease Applic. Area
A. PINELAND SYSTEMS				
1. High pineland				
a. Turkey oak phase	700	0.4	163	23
b. Old Field phase	525	0.3	0	0
Total High pineland	1,225	0.8	163	13
2. Pine-palmetto flatwoods				
a. Longleaf pine phase	26,195	17	8,152	31
b. Slash pine phase	74,043	47	27,504	37
c. Longleaf pine-slash pine phase	5,724	4	974	17
d. Pond pine phase	small acreage			
Total Pine-palmetto flatwoods	105,962	67	36,630	35
TOTAL PINELAND SYSTEMS	107,187	68	36,793	34
B. BAY SYSTEMS				
1. Cypress swamps				
a. Pond cypress-blackgum phase	25,045	16	7,421	29
b. Pond cypress-slash pine phase	4,393	3	3,310	75
c. Cypress domes (Cypress ponds)	698*	--	293*	42
d. Bold cypress-blackgum ash phase	small acreage			
Total Cypress swamps phase	29,438	19	10,731	36
2. Bay swamps				
a. Mixed bay swamp (bayhead)	14,972	9	3,993	26
b. Fetterbush swamp (shrub bog; pocosin)	4,295	3	361	8
Total Bay swamps	19,267	12	4,354	22
TOTAL BAY SYSTEMS	48,705	31	15,085	30
C. RIVER SYSTEMS				
1. Creek Swamps	1,340	0.9	845	63
2. Hammocks	Not measurable			
TOTAL RIVER SYSTEMS	1,340	0.9	845	63

*Number of cypress domes 10 acres or less in area recognized on soil survey.

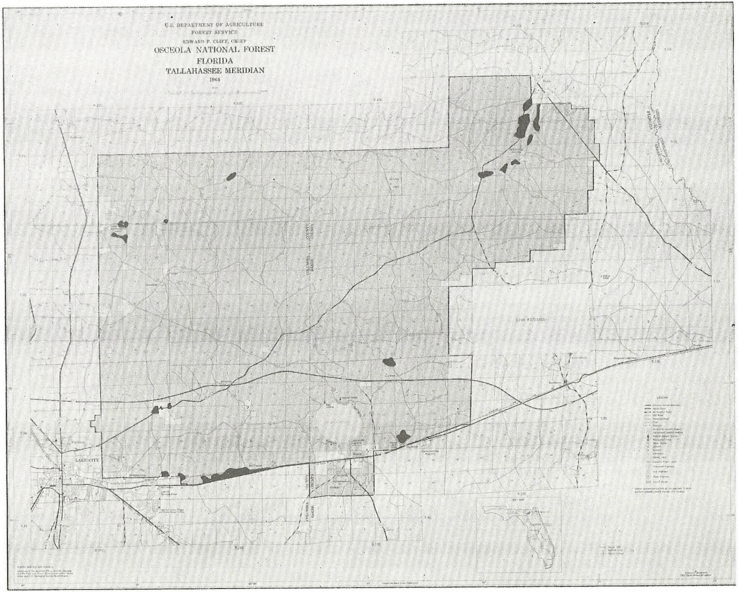

Figure 17a. High Pineland

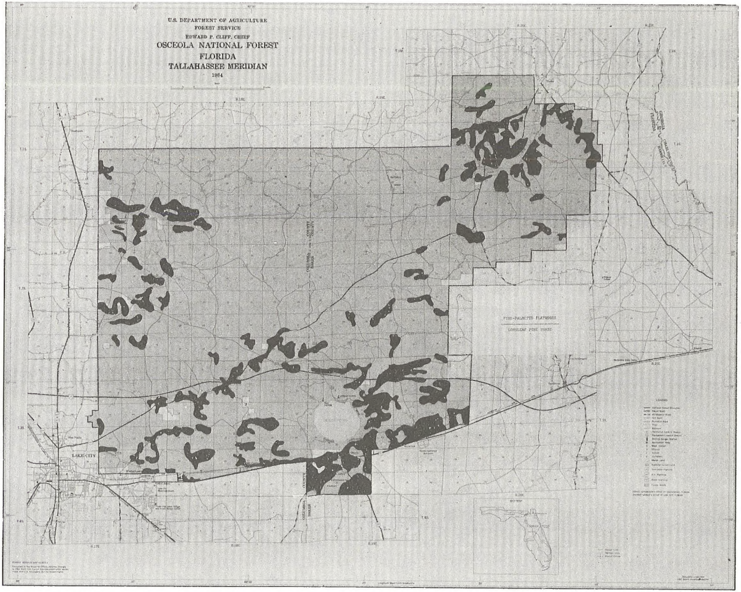

Figure 17b. Pine – Palmetto Flatwoods (Longleaf Pine Phase)

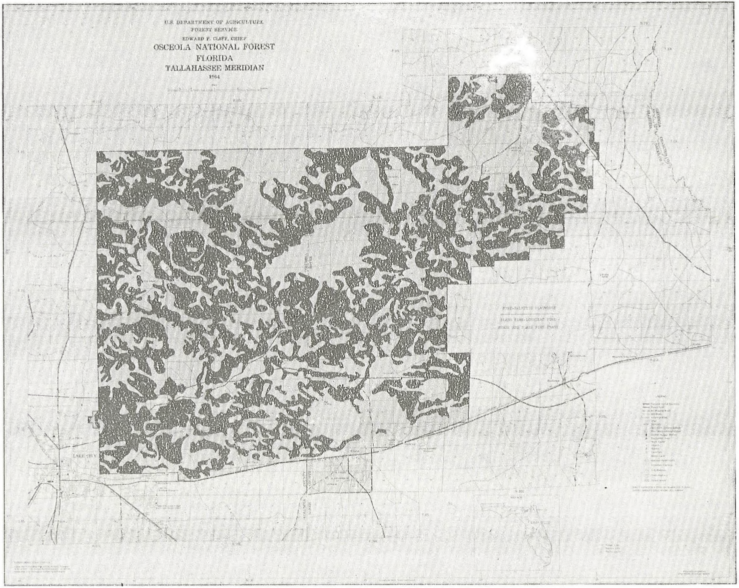

Figure 17c. Pine – Palmetto Flatwoods (Slash Pine – Longleaf Pine Phase and Slash Pine Phase)

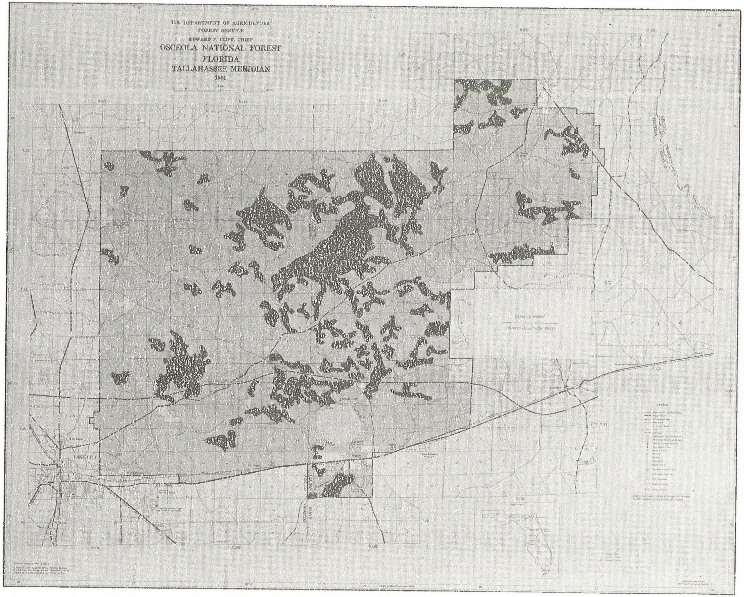

Figure 17d. Cypress Swamp (Cypress – Blackgum Phase)

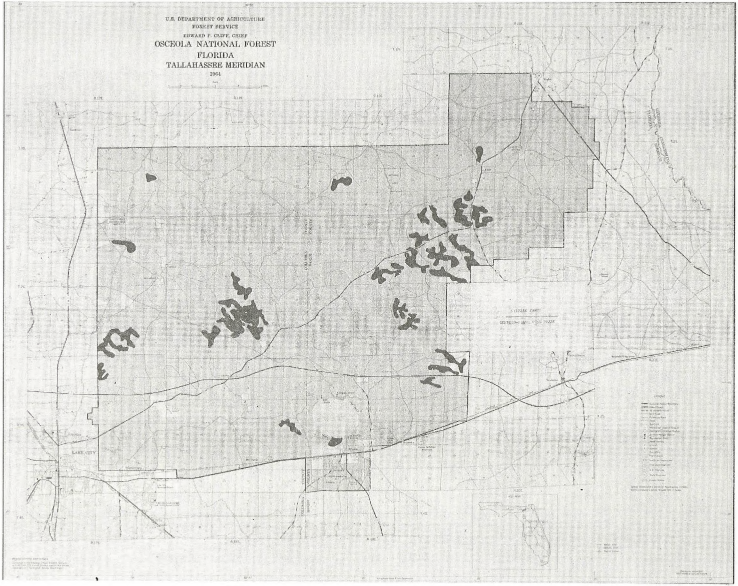

Figure 17e. Cypress Swamp (Cypress – Slash Pine Phase)

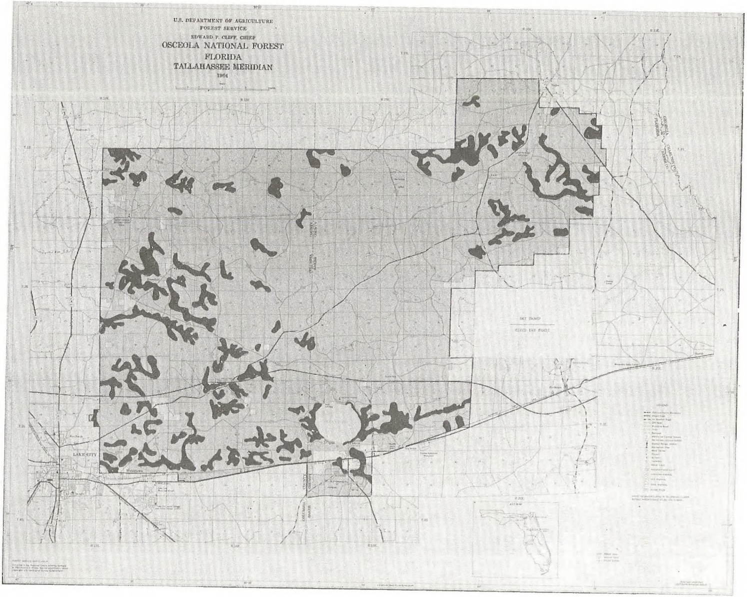

Figure 17f. Bay Swamp (Mixed Bay Phase)

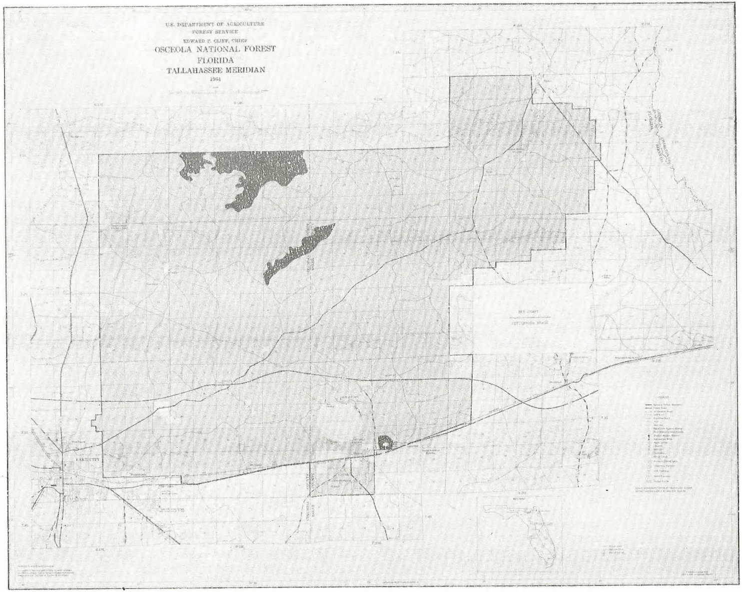

Figure 17g. Bay Swamp (Fetterbush Phase)

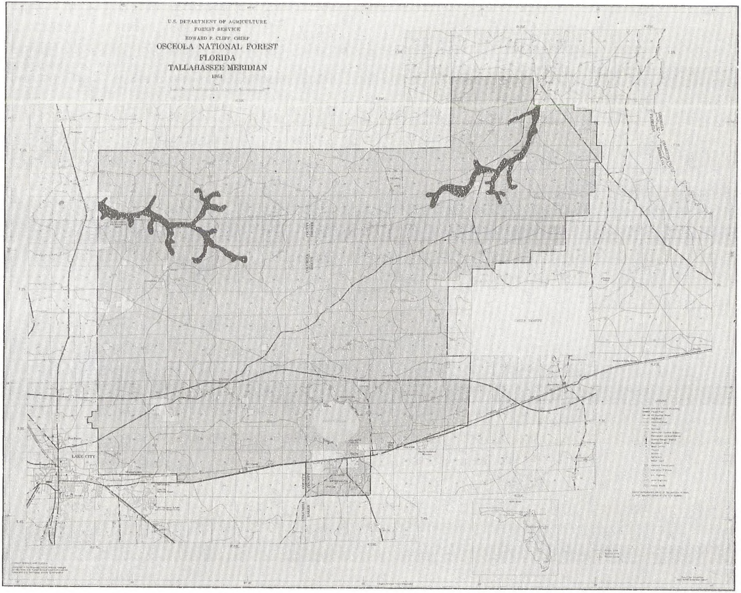

Figure 17h. Creek Swamps

primarily on the relative composition of the overstory species.

The longleaf pine phase is characterized by forests of this species in which no other tree species are present except an occasional slash pine. There is no subcanopy in this phase. On the drier soil types the shrub layer consists of saw palmetto; on wetter soils it consists of saw palmetto, blueberry, dwarf live oak, dwarf huckleberry, dangleberry, and gallberry. The herb most prevalent is wiregrass, followed by milk pea, *Andropogon capillipes*, *Polygala* spp., common stargrass, deer's tongue, muscadine grape, *Aster squarrosus*, and several milkweeds.

The slash pine phase usually has no subcanopy. The canopy consists of slash pine and occasionally a few longleaf pines, pond pines, or loblolly bay. The understory is usually dense and ranges in height from 0.5 meters to 2 meters (1.6 to 6.6 ft.), except in stands where controlled burning has recently taken place. Occasionally a subcanopy is present, consisting of scattered loblolly bay (which is primarily a species of the margins of cypress domes and bay swamps) and scattered-to-numerous wax myrtle. The dominant shrubs are saw palmetto and gallberry, which tend to grow in pure stands from 0.5 to 2 meters (1.6 to 6.6 ft.) in height. Wax myrtle, *Lyonia fruticosa*, tarflower and dangleberry tend to occur singly, while fetterbush and sweet gallberry form sizeable populations, but are not especially widespread.

The longleaf pine-slash pine phase combines the characteristics of the previous two phases in various combinations (some stands, for example, assume more characteristics of the longleaf pine phase than the slash pine phase, while others assume more characteristics of the slash pine).

The pond pine phase consists of narrow bands at the margins of cypress domes and mixed bay swamps scattered throughout the Forest. The canopy tree is pond pine (approximately 4 to 10 meters (13 to 33 ft. tall). The subcanopy consists only of loblolly bay. The shrub cover is dense, about 2 meters (6.6 ft.) in height, and consists of gallberry and saw palmetto. Pond pine develops only on soils that are seasonally wet and low in nutrients.

Bay Systems

Cypress Swamps

Cypress swamps cover nearly a quarter of the Osceola National Forest. In this type, four phases are recognized: pond cypress-blackgum phase, pond cypress-slash pine phase, bald cypress-blackgum-ash phase, and the cypress dome phase. Only the first two of these phases have been mapped; the cypress dome phase and the bald cypress-blackgum-ash phase are small in acreage and scattered throughout the pine-palmetto flatwoods.

Pond cypress and blackgum are the most abundant canopy trees in the pond cypress-blackgum phase. Occasionally, slash pine, sweet bay, and sweetgum are present as canopy species. The subcanopy is usually dahoon (myrtle). The latter is more typical of cypress domes. Red bay is usually present in small numbers and bamboo-vine climbs to subcanopy height.

The percentage of shrub cover in the pond cypress-blackgum phase is extremely variable, ranging from zero to 80%. When shrub cover is present, fetterbush is by far the most abundant shrub species. It is usually about 3 meters (10 ft.) in height, and although generally restricted to tussocks on tree stumps, it sometimes forms impenetrable thickets. Other species in the shrub layer include the fetterbush-like *Leucothoe racemosa*, virginia willow, wax myrtle, and sweet gallberry. The ground layer is seldom continuous and includes several species of sedges, Virginia chain fern, lizard's tail, spider lily, and pickerelweed. Submerged aquatics in the central parts of the swamp include bladderwort and frogbit.

There are 25,045 acres of pond cypress-blackgum phase swamps in the Osceola National Forest in units of all stages ranging from 10 to 6,400 acres. These usually grade into other swamp-types, but end abruptly at flatwoods edges and never invade them. Practically all of the old-growth stands in the Osceola National Forest have been cut. The biggest second-growth stands can be found in Big Gum Swamp, Otter Bay, Little Gum Swamp, and Buckhead Swamp. There are remnants of old growth in Fanny Bay, the Natural Area, and several small stands between Big Gum Swamp and Impassable Bay. Existing trees in these stands are old, if not senescent. Early logging practices caused some long-term vegetational changes in the Big Gum Swamp, where long strips of land over which cut cypress were skidded out of the swamp have become fetterbush thickets.

The pond cypress-slash pine phase is probably better described as an ecotone than a distinct vegetation type. The pond cypress-slash pine phase usually appears as a fringe around the edges of cypress domes and around the pond cypress-blackgum phase—generally on somewhat drier sites. Stands of this phase usually contain pond cypress, blackgum, slash pine, and occasionally red bay and sweet bay. The subcanopy, which is usually sparse, contains blackgum, laurel oak, wax myrtle and red bay. Shrub cover is extremely variable, consisting of fetterbush, *Leucothoe racemosa*, and some herbs. Some stands, however, have only a thin canopy and a thick growth of shrubs. Stands of the pond cypress-slash pine phase occur throughout the pine-palmetto flatwoods in the western half of the Forest. Most of these are small and unmapped. There are approximately 4,393 acres of pond cypress-slash pine phase swamps on the Osceola, distributed mainly around the western half of the Forest. Related types in the eastern part of the Forest are classified as bay swamps.

Stands of the pond cypress-slash pine phase are about 15 to 50 acres in size and are scattered throughout the Osceola. Many of the stands look like large cypress domes. A number of stands near Impassable Bay, however, are larger and are more flatwoods-like. This phase is an ecotone between the distinct wetlands and flatwoods. The terrain between these two ecosystems seems not to provide optimum habitat for either cypress or slash pine, but instead provides a marginal zone where both occur.

Cypress domes are essentially small (10 acres or less) stands of the pond cypress-blackgum phase of the cypress swamp type. Cypress domes seem to occur anywhere in the pine-palmetto flatwoods where the elevation is a little lower than the surrounding area. They have a dome-like appearance, the taller pond cypress trees in the center and the shorter trees on the periphery. Slash pine and blackgum may also be present in cypress domes. Dahoon is a species more or less characteristic to cypress domes. Dahoon is present in the subcanopy, as is loblolly bay. The latter may be very abundant, particularly around the margin of the cypress dome. Fetterbush and sweet gallberry are usually the predominant shrubs. Ground cover generally consists of some rushes, sedges and peat moss. Frog-bit and bladderwort are present as submerged aquatics, and in cypress domes that have deep standing water, fetterbush, *Pieris phyllyreifolia*, will also occur. There are approximately 700 cypress domes in the Forest, distributed more or less evenly throughout the flatwoods. Pine-palmetto flatwoods usually constitute the sole adjoining type. Most of the cypress domes have been cut for cypress at some time in the past. Many of the domes in the northern portion of the Forest were destroyed in the Buckhead fire of 1955.

The bald cypress-blackgum-ash phase is a forest-type vegetational association essentially restricted to the Florida peninsula and consisting mainly of bald cypress and shorter individuals of blackgum, Carolina ash, and pumpkin ash. The subcanopy consists of the ash and blackgum trees (shorter than canopy types) and occasionally of dahoon, red bay, or, in relatively drier sites, ironwood. The general appearance of the shrub layer is open with an occasional wax myrtle and fetterbush. The percentage of ground cover varies from slight to 80%. The most common species in the ground layer are the grass, *Panicum gymnocarpon*, beak rush, and lizard's tail.

The bald cypress-blackgum-ash phase occurs in only one locality of the Osceola National Forest; north of FS 262 in Impassable Bay. It borders pine-palmetto flatwoods, low hammocks, and pond cypress-blackgum areas. This type of swamp rarely burns.

Bay Swamps

Bay swamps occur in two phases in the Osceola National Forest: mixed bay phase (also called bayhead) and fetterbush phase. Together they occupy some 19,267 acres, or approximately 12% of the Forest.

The mixed bay phase is a dense wetland forest with a partially closed canopy consisting of sweet bay, red maple, blackgum, pond pine, and bald cypress. The subcanopy is composed of smaller canopy species and tangles of bamboo-vine and muscadine grape. The most abundant shrubs include wax myrtle, fetterbush, sweet gallberry, and Virginia willow. The general appearance of the mixed bay phase is that of a dense, almost impenetrable thicket. It is seasonally flooded. The mixed bay phase occurs throughout the Osceola and covers approximately 9% of the Forest (14,972 acres).

The fetterbush phase is a wetland shrub or "shrub bog"association. Trees are scarce, consisting mainly of scattered slash pine and pond cypress. The dominant plant is fetterbush, but lawn-like mats of the rush, *Fimbristylis* sp., and open glades of Virginia chain fern are typical. Titi and fetterbush are the dominant shrubs and are frequently covered by a blanket of bamboo-vine. Clumps of green arum are common and white arrow arum is usually present. The Forest includes some 4,295 acres of fetterbush phase covering approximately 3% of the total Forest. Most of this acreage is in Impassable Bay and Big Gum Swamp.

River Systems

Creek Swamps and Hammocks

Two types are included in the river system: creek swamp and hammock. Of creek swamp there are approximately 1,340 acres in the Osceola National Forest, distributed along Deep Creek and Middle Prong St. Marys. The creek swamp is restricted to the flood plains of these two streams and is best described as a mixed swamp, consisting largely of bald cypress, loblolly pine, and several hardwood species. The canopy composition varies; the major species are loblolly pine, diamond-leaf oak, sweetgum, red maple, and bald cypress. Subcanopy species include Carolina ash, water elm, and Ogeechee tupelo; the last, however, apparently does not grow along Deep Creek. The hollies, *Ilex opaca* and *I. cassine* (and/or hybrids), occur on somewhat drier sites in the creek swamp. Also present in the creek swamps are sweet bay, loblolly bay, cabbage palm, and water oak.

Fetterbush is the most common shrub in this system. Also abundant are muscadine grape, saw palmetto, and several species of the climbing vine, *Smilax*. The blueberry, *Vaccinium elliottii*, sweet gallberry, Virginia willow, and the fetterbush, *Leucothoe uxillaris*, are also present in the shrub layer. The herbaceous component of creek swamp is not especially well developed, except among several species of sedges. A number of epiphytes are present, including the green fly orchid, resurrection fern, and airplant, which grows generally on the larger trees. There are no signs of fire in the creek swamp phase. The major disturbance in this phase is windfall, particularly as it affects the diamond-leaf oaks in the Middle Prong St. Marys floodplain.

Hammocks are usually subdivided into three phases: hydric, mesic, and xeric, depending on relative dryness. All the hammock phases of the Osceola National Forest are, however, mesic hammocks. Within the Forest, hammock phases are small, scattered and isolated. They have not been mapped, and no acreage figures are available for them. Their total area may not exceed 1,000 acres. The dominant trees are usually oaks, with the canopy composed of water oak, live oak, sand live oak, laurel oak, diamond-leaf oak, sweetgum, southern magnolia, water hickory and hackberry. The subcanopy usually consists of smaller canopy species, as well as American holly and ironwood. Saw palmetto is the most common shrub. Blue palm occurs at some sites. The presence of herbs is extremely variable, ranging from nil to a complete cover of lawn-like grasses and sedges.

The hammocks in the Osceola National Forest occur either as ecotonal communities between pine-palmetto flatwoods and pond cypress-blackgum or mixed swamp, or as ecotonal communities on well-drained sites (high pineland) bordering creek swamps. Small patches of evergreen oaks may stand more or less isolated in pine-palmetto flatwoods. Fires in this phase are apparently rare, but fire scars can be found on larger trees.

Aquatic Community

The various aquatic areas within the Osceola National Forest are considered part of the terrestrial and wetland types in which they occur. There are, however, four exceptions:

—Where creeks intersect roads in the Forest, they have been widened and deepened to reduce the possibility of flooding in the vicinity of the roads. These small ponds provide quality habitat for small alligators, numerous species of fish, amphibians, turtles and wading birds.

—Several small areas in the Osceola National Forest have been excavated for clay or sand fill as needed in local road construction. The borrow pits thus created also serve as additional good quality habitat for small alligators, wading birds, turtles, fish and amphibians.

—Ocean Pond, a 1,750 acre lake, is shallow throughout, with a maximum depth of 16 feet. The bulk of its shoreline is ringed with cypress.

—The northern one-fifth of the 50-acre Watertown Lake is located in the southwest corner of the Forest.

Endangered Plants

—Chapman's rhododendron, *Rhododendron chapmanii*, is the only officially listed endangered plant species that may occur on the Forest. If Chapman's rhododendron is present, the high pineland and pinepalmetto flatwoods communities would be the most likely areas of suitable habitat.

Five species of plants proposed by the Fish and Wildlife Service for endangered listing have been identified as possibly present in the Osceola National Forest. Although the Forest appears to provide suitable habitat for these species, none were found within the Forest during the course of the FWS study. The five species of plants are:

—*Andropogon arctatus*, which may occur sporadically within the large expanses of pine-palmetto flatwoods characteristic to this area.

—*Balduina atropurpurea*, a plant of wet, pitcher plant bogs, seepage slopes (Faircloth 1971) and possibly the margins of bottomland hardwood stands.

—Florida willow, *Salix floridana*, which occurs on the banks of small streams and in low, calcareous hammocks.

—West's flax, *Linum westii*, which seems to occur primarily around ponds in pine-palmetto flatwoods and in boggy areas bordering cypress swamps.

—Whitlow wort, *Paronychia rugelii* var. *interior*, a plant of high pineland.

Florida's new Rare Plant Law (Preservation of Native Flora of Florida, 1978) is in Appendix 3 of this supplement. According to Suzanne Cooper, Environmental Specialist with the Florida Game and Fresh Water Fish Commission, the following State-listed species are known to occur on the Osceola. Additional field search could reveal the presence of other State-listed species.

Kalmis hirsuta (Wicky)
Ilex cassine (Dahoon)
Ilex coriacea (Sweet Gallberry)
Ilex opaca (American Holly)
Rhododendron sp. (Azalea)
Sabal minor (Blue Stem Palm)
Spiranthes sp. (Ladies' Tresses)
Cleistes sp. *(divaricata)* (Rosebud Orchid)
Pagonia ophioglossoides (Rose Pagonia)
Sarracenia, several sp., (Pitcher Plants)
Rhapidophyllum hystrix (Needle Palm)

2. Wildlife and Fisheries

Game population estimates a and c (pg. II-39) have been updated since the FES was written:

a. Deer: 3,000-3,300

c. Florida black bear: minimum of 40—additional information is provided in the threatened and endangered species section below.

The description of fishing and hunting activities on pg. II-39 has been updated as follows:

In 1977, fishing accounted for 17,400 visitor-days use. Hunting accounted for 19,600 visitor-days use, mostly for deer hunting. These figures represent a 34% increase for fishing and a 44% increase for hunting over the 1971 data used in the FES.

A total of 11,931 man-hours of fishing on Ocean Pond resulted in a total catch of 7,726 fish between December 1, 1976 and November 30, 1977. A total of 2,377 man-hours of fishing on Watertown Lake resulted in a total catch of 1,939 fish between February 5 and May 27, 1975 (Creel Surveys— Florida Game and Fresh Water Fish Commission). Of the 8 lakes surveyed in northeast Florida, Ocean Pond and Watertown Lake ranked first and fourth, respectively, in the number of fish caught per hour.

The following information replaces the original "threatened species"discussion beginning on pg. II-39.

The endangered species study directed by Secretary Kleppe included all those species considered to be in some status of endangerment by various agencies and organizations. For the sake of brevity, only vertebrate species that are afforded legal protection by the Federal or State governments have been included in this supplement.

For information pertaining to those species included in the lists compiled by the Convention on International Trade in Endangered Species of Wild Fauna and Flora (ESSA); Georgia Department of Natural Resources, Game and Fish Division; Florida Committee on Rare and Endangered Plants and Animals; Georgia Endangered Species Committee; Southeastern Section of the Wildlife Society; Society for the Study of Amphibians and Reptiles; Report of the Committee on Conservation, American Ornithologists' Union; The Blue List for 1977, American Birds 1976; American Fisheries Society; and the International Union for Conservation of Nature and Natural Resources, refer to FWS Report (Mar. 78). Complete bibliographical entries for the research studies cited below may be found in the same report, pp. 394-415.

The FWS Report (Mar. 78) discusses studies made on the Forest, portions of the Suwannee River, and also on adjacent private lands. One such privately owned study area was the Occidental Chemical Company phosphate mine located about 20 miles west of the Forest. This mine is operating in habitats similar to those Forest areas that would be mined under the proposal. Therefore, these areas were sampled for comparative purposes to determine if threatened or endangered species would inhabit mined or reclaimed areas.

Table 7 indicates the legal status (Federal or State classification) and the suspected presence (based on the presence of suitable habitat or records from adjacent areas), confirmed presence (based on the most recent confirmation by a recognized authority), or doubtful presence (based on the lack of suitable habitat or records) of these species within the Osceola National Forest or the Suwannee River. No "Critical Habitat"(see Glossary, chapter X) has been established within the Forest for any of the species included on the list.

No attempt has been made to prioritize these species on the basis of numbers observed or the failure to confirm their presence. The fact that a species has not been "confirmed"does not preclude its presence. The ability or failure to observe an individual of any species is the result of a variety of interrelated factors, among them numbers, habitat preferences, size, range, mobility, habits, and activity periods.

For most species on the Federal or State endangered or threatened lists, their status of endangerment is a result of habitat loss—a reduction in the ability of the land to support them in sufficient numbers to assure their continued existence. Habitat, therefore, is the key element in their survival, or in the reestablishment of their numbers so that they are no longer in endangerment. Habitat is also important, not only in those locations where the species may be found at present, but in those areas that appear to contain the elements vital to the survival of the species, even though the species may not occupy those areas right now.

Florida Panther

The Florida panther is a wide ranging, secretive animal that historically inhabited most of the southeastern United States, including every major habitat type in Florida, and has been confirmed twice on the Osceola. Population estimates in Florida, made by members of the Florida Panther Recovery Team, range from 20 to 200 individuals.

Panther habitats are remote, densely vegetated areas that are relatively free from human disturbance and contain an ample supply of food, principally deer.

The entire Osceola National Forest is potential panther habitat, but Impassable Bay and Big Gum Swamp appear to be the most suitable areas because they offer the greatest protection from human disturbance, and form a connecting corridor to additional remote areas to the north, including the Okefenokee National Wildlife Refuge.

Florida Manatee

The manatee is an aquatic mammal that inhabits both fresh and salt water areas and feeds on a variety of aquatic vegetation. Manatees are known to frequent the lower reaches of the Suwannee River during summer months, and several of the springs that feed the river are used as winter refuges. Recent reports of manatees in the Suwannee River have been limited to the reach of river below Oldtown. Shoal areas and rapids probably would restrict the movement of manatees much farther upstream than Branford. No manatees were observed within the study area.

Gray Bat

Generally, gray bats require caves for roosting, hibernation, and reproduction. However, three summer colonies have been reported outside of caves, one in a storm sewer and two in buildings. Members of the species forage for insects over water and vegetation adjacent to streams, rivers, and reservoirs (Humphrey and Tuttle, 1976). Within the Forest, Deep Creek and Middle Prong St. Marys provide the most likely foraging habitat.

Two bats were collected within the Osceola National Forest during the FWS Study. One juvenile, too young to have migrated from the presently known nursery roosts in western Florida, was collected in the vicinity of the Middle Prong St. Marys, outside the potential phosphate deposit areas. No gray bats were observed elsewhere in the Forest during the course of the study; one possible explanation for this could have been drought conditions in the Forest.

Bachman's Warbler

The Bachman's warbler, if extant, is one of the rarest of the endangered birds. It breeds in southern hardwood swamps north of Florida, winters in Cuba, and migrates northward through Florida from late February to early April and southward from July to early September.

The reasons for the decline of this species are obscure. No Bachman's warblers were found on the Forest during the course of the FWS study, but an unconfirmed report of a Bachman's warbler was made in Lake City, 3 miles from the southwestern corner of the Osceola National Forest. The last confirmed record of Bachman's warblers were specimens collected along the Suwannee River.

TABLE 7--Threatened and Endangered Species Suspected, Confirmed, or Doubtful on the Osceola National Forest or the Suwannee River

	Listed By			
Species	U.S. FWS	State of Florida	Occurrence	
Florida Panther	Endangered	Endangered	Confirmed	Coleman, 1976
Florida manatee	Endangered	Threatened	Confirmed[1]	
Gray bat	Endangered	Endangered	Confirmed	FWS Report (Mar. 78)
Bachman's warbler	Endangered	Endangered	Suspected	
Bald eagle	Endangered	Threatened	Confirmed	FWS Report (Mar. 78)
Ivory-billed woodpecker	Endangered	Endangered	Suspected	
Arctic peregrine falcon	Endangered	Threatened	Doubtful	
Red-cockaded woodpecker	Endangered	Endangered	Confirmed	FWS Report (Mar. 78)
American alligator	Threatened	Threatened	Confirmed	FWS Report (Mar. 78)
Eastern indigo snake	Threatened	Threatened	Confirmed	FWS Report (Mar. 78)
Florida black bear		Threatened[2]	Confirmed	FWS Report (Mar. 78)
Sherman's fox squirrel		Threatened	Confirmed	FWS Report (Mar. 78)
Florida sandhill crane		Threatened	Confirmed	FWS Report (Mar. 78)
Osprey		Threatened	Confirmed	FWS Report (Mar. 78)
Southeastern kestrel		Threatened	Confirmed	Steve Stafford, Florida Game & Fresh Water Fish Commission, 1978
Wood stork		Endangered	Confirmed	FWS Report (Mar. 78)
Gopher tortoise		Threatened	Confirmed	FWS Report (Mar. 78)
Short-tailed snake		Endangered	Suspected	
Suwannee cooter		Threatened	Confirmed[3]	
Florida gopher frog		Threatened	Doubtful	
Atlantic sturgeon		Threatened	Confirmed[4]	

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[1] Suwannee River near confluence of Santa Fe River, Moore, 1950, in FWS Report (Mar. 78)

[2] Except in Baker and Columbia Counties and in the Apalachicola National Forest (State of Florida Wildlife Code - July 1978).

[3] Upper Suwannee River near White Springs, FWS Report (Mar. 78)

[4] Suwannee River near Ellaville, Huff, 1975, in FWS Report (Mar. 78)

Bald Eagle

There are approximately 250 known bald eagle nest territories in Florida. The majority of these territories are located along the west coast from Cedar Key south; within the Everglades; and in the central section of the peninsula, generally south of Levy, Alachua, Putnam and St. John's Counties. Isolated, scattered nest territories are also known to exist in northern Florida and in the Panhandle, but no nests are known to exist within the Osceola National Forest. There are only a few records of bald eagles in the Forest, and during the FWS study only one eagle was reported within the eastern border of the Osceola.

For nesting in central Florida, the bald eagle appears to require the presence of large pine or cypress trees, usually isolated from human disturbance, and in general proximity to large open bodies of water containing a supply of prey.

The decrease in suitable nesting sites, along with shooting and pesticide contamination, appear to be primary causes of the decline of the species in the State.

Ivory-Billed Woodpecker

The ivory-billed woodpecker formerly was found in remote river swamps throughout the state. It was last recorded in Florida in 1969 (Agey, et al, 1971) in the vicinity of Highlands Hammock State Park. It is possible that the species may no longer exist in Florida.

There is no evidence to indicate that the bird is presently within the Osceola National Forest, although museum specimens dating back to 1914 prove that the bird did occur in Baker County adjacent to the Osceola National Forest. The precise location of that occurrence is unknown.

Should the ivory-billed woodpecker be present, the areas most likely to be suitable habitat would be Big Gum Swamp and Impassable Bay. Big Gum Swamp and Impassable Bay both tie into the Okefenokee Swamp system in southern Georgia and provide suitable habitat.

Arctic Peregrine Falcon

The arctic peregrine falcon breeds north of the tree line in North America. It winters along coastal Florida to the eastern Mexican coast; Baja, California; and south to mid-Chile and mid-Argentina. The migration pattern of the peregrine funnels into the Florida coastal area, and winter concentrations are found along the beaches and barrier islands. The peregrine requires an area containing an abundance of prey species in an open habitat. Florida's coastal marshes provide such habitat, where wintering peregrines feed on ducks, coots, gulls, and other aquatic birds.

There are no known records of arctic peregrine falcons in the Osceola National Forest. The existing habitat probably does not provide all of the requirements of the species.

Red-Cockaded Woodpecker

The red-cockaded woodpecker is a cavity nesting bird with a specific habitat requirement for open, park-like stands of southern pines that include some trees infected by a heart rot fungus that enables cavity construction. Cavity trees are usually at least 60 years of age. All colonies on the Forest are in the pineland vegetation system.

The current population on the Forest is estimated at 50 to 60 colonies. The Osceola population, between 120 and 180 birds, constitutes about 10% of the estimated total Florida population.

American Alligator

Originally classified by the FWS as endangered in 1967, this species was reclassified in Florida as threatened in 1977, following a significant comeback in population levels. The alligator inhabits wetland sites, both natural and man-made. The historical decline in alligator numbers has been attributed primarily to overharvesting rather than habitat loss. The species is presently found in a variety of wetland sites throughout the Osceola National Forest.

Eastern Indigo Snake

The eastern indigo snake ranges throughout the Florida peninsula with an erratic distribution in the Florida panhandle, southern Georgia, and southeastern South Carolina.

Eastern indigo snakes occur in a wide variety of habitat types in Florida. The snakes are most characteristic of low, wet pine-palmetto flatwoods, bay swamps, glades and hammocks, especially in the southern half of the state. In the northern half of Florida and elsewhere in the Atlantic and Gulf Coastal Plain, indigos are often associated with the burrows of the gopher tortoise, which are found in high, xeric sites such as high pineland and xeric hammocks (Kochman 1976). Since laboratory experiments indicate that the indigo is susceptible to dessication (Bogert and Cowles 1947), its limited occurrence in the drier habitats may be a result of the low gopher tortoise populations.

A post-cranial skeleton, found along Deep Creek near FS Road 237, and a dead specimen found on SR 250, indicate the presence of the species on the Forest. General knowledge of the species' biology and the habitats available on the Osceola suggest that the species could be found throughout the area.

Florida Black Bear

In Florida, black bears are found mainly in swamps and are usually associated with dense, practically impenetrable thickets (Pelton and Nichols 1973). The optimum Florida bear habitat combines flatwoods, swamps, scrub oak ridges, bayheads and hammock habitats (Harlow

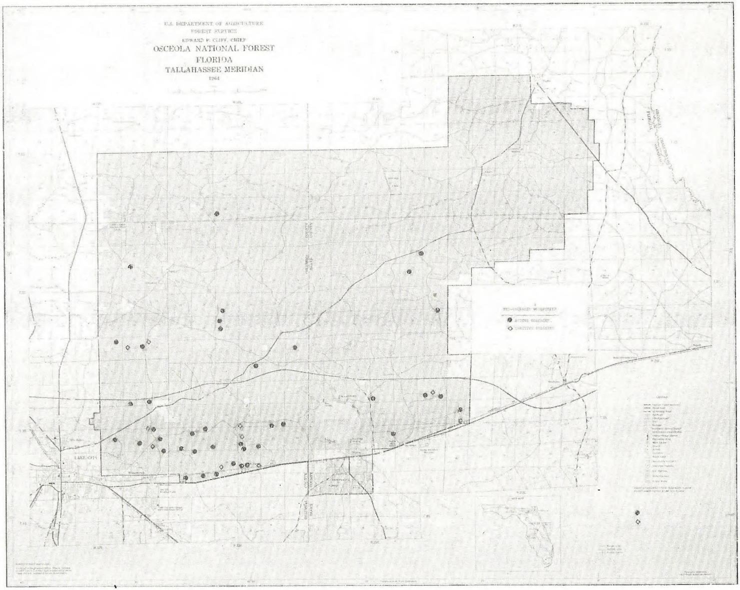


Figure 18. Red-cockaded Woodpecker Colonies

1962a). Such a mixture of habitat types provides bears with various food sources and escape cover.

Although a State threatened species, the black bear is still a legal game animal in the Apalachicola National Forest and in Baker and Columbia Counties. The bear populations in these areas are considered adequate to allow limited hunting (McDaniels, in press). The basis for the threatened status in Florida is the continued loss of bear habitat elsewhere in the State (Williams 1976b).

Bear observations during the Osceola study included five bears killed by hunters, 169 sets of bear tracks, 70 scats, 11 feeding areas, 9 bears seen crossing roads and 15 bears captured alive. Of these, 13 were released with radio collars and 191 radio telemetry locations were recorded. There are a minimum of 40 bears known to use the Forest.

The bear population in the Forest is concentrated around the large swamps and bays, especially Big Gum Swamp and Impassable Bay (see Fig. 19). The Big Gum Swamp and adjacent habitats make up a 14,200 acre tract of land in the north-central part of the Forest, the largest such area with limited human access in the Forest. It is believed that at least 85% of the bears use this region. The majority of bear sign was found on the western side of the Big Gum Swamp region, on and near FS 232 and FS 233. About half of the Forest's bears use the southern half of Impassable Bay. The density of bears in the ecotone between Big Gum Swamp and Impassable Bay at times approaches one bear per 3.5 km² (1.4 sq. mi.). Bears also use the slightly smaller cypress-blackgum swamps (such as Otter Bay, Little Gum Swamp, Cowhouse Bay, Fanny Bay and Buckhead Swamp) and their ecotones with the adjacent pine-palmetto flatwoods. Each is used by four to six bears. The distribution of bears in the Osceola National Forest seems to be dependent upon the availability of escape cover and food resources.

Sherman's Fox Squirrel

Sherman's fox squirrel occurs from southeastern Georgia through peninsular Florida, west to Gilchrist and Levy Counties, and southward to Highlands and Hillsborough Counties (and possibly to the Caloosahatchee River) (Moore 1956).

Alteration and loss of habitat are the reasons for the current status of this species (Ehrhart 1976).

The virgin pine forest of the southeastern coastal plain was once the optimal habitat for fox squirrels (Moore 1957). Today, fox squirrels are found most frequently in open pine-palmetto flatwoods, but also in sand pine scrub, high pineland, swamp borders and bayheads (Moore 1946, 1957).

A total of 19 fox squirrels were observed in the study area during the course of field work. The majority of these sightings were south of SR 250, particularly in the southwestern portion of the Forest. Another area of concentration is along FS 235, between FS 235-E to the north and FS 248 to the south.

Florida Sandhill Crane

The Florida sandhill crane is found throughout peninsular Florida, west to the Apalachicola River and north to the Okefenokee swamp of Georgia (Williams 1976c).

The Florida sandhill crane is associated with shallow, open prairies, lowland pastures, irrigated farmlands, and other treeless wetlands, where it feeds on both vegetation (roots, grain and seeds) and animals (large insects, amphibians, reptiles and small mammals). The fetterbush phase of bay swamp on the Osceola contains suitable habitat. The species is nonmigratory.

Florida sandhills have been observed in Impassable Bay. Williams and Phillips (1972) reported that Pinhook Swamp (Sec. 28, T. 1 N., R. 19 E.), just north of the Forest, is also a possible breeding locality for the birds. While no Florida sandhill cranes have been observed in Big Gum Swamp, that location offers similar habitat and the birds might utilize this area as well.

Osprey

Ospreys breed throughout North America, and winter in south Florida, the West Indies, Central and South America. In most of their range in eastern United States, osprey populations have been greatly reduced by the effects of pesticides.

Feeding almost totally on fish, the osprey depends on large areas of open water. (It fishes by diving into the water, catching a fish, and then flying off to a perch to eat.) The osprey builds its large stick nests on top of large trees, telephone poles or on other elevated areas.

During the FWS study one osprey was observed one time over Ocean Pond. Suitable habitat does not appear to be present on the Osceola.

Although Ocean Pond is as large as other lakes to the south that do support nesting ospreys, neither nests nor breeding behavior was observed during the FWS study. Nesbitt (1974) found that three-quarters of the osprey diet on Newnan's Lake (approximately 65 km (40 mi.) south of Ocean Pond) consisted of gizzard and threadfin shad. Gilbert (1973) found no shad in Ocean Pond, an absence which may explain the limited occurrence of osprey in the Forest.

Southeastern Kestrel

The southeastern kestrel, a subspecies of the American kestrel, has declined in the past 20 years. This raptor once could be found in almost any open habitat, including open pinewoods, fields, marshes, prairies, and even in large cities; now it is rare in many of these areas. The kestrel nests in tree cavities, and feeds mainly on large grasshoppers and other insects, but will also eat reptiles, birds, and small mammals.

Kestrels are often observed over the Osceola during the summer, indicating that the threatened subspecies and suitable habitat are present (Stafford, personal communication).

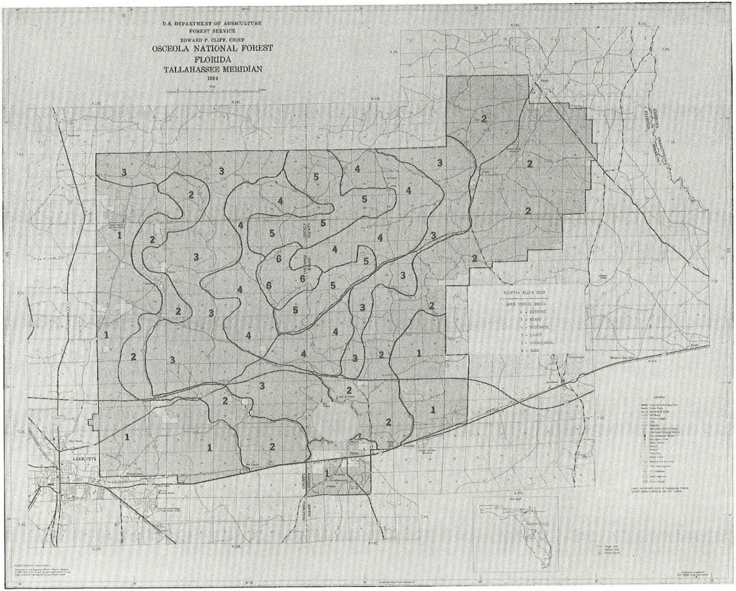


Figure 19. Florida Black Bear Distribution

Wood Stork

Once a common breeder along the coast from North Carolina to Florida and westward to Texas, the U. S. population of wood storks now breeds only in Florida and in Georgia's Okefenokee Swamp. Only 20 nesting colonies are known, representing 12,000 birds. The latter figure reflects a drastic reduction from the 75,000 storks estimated in Florida during the 1930's (Ogden 1976a).

Although nesting colonies of the wood stork were not found in the Forest, post-breeding wanderers do occur there. Wood storks were observed in the Forest from May to October in 1976 and from March to June in 1977. In 1976, groups numbering from one to ten birds were observed in flight. Larger numbers were encountered on two occasions in the spring of 1977. One flock was observed in May along SR 250-A, just south of SR 250, feeding and roosting in a drying swamp. The second flock, over 90 individuals in all, was found during the same month at the point FS 236 crosses a small creek north of FS 277. The flock was feeding in the few pools that remained in the drying creek bed.

Gopher Tortoise

The gopher tortoise ranges from the tip of the Florida peninsula, north to southern South Carolina and west through southern Georgia, Alabama, and Louisiana and into eastern Texas and southern Arkansas.

Open, well-drained, sandy sites, occurring in many vegetative types, provide habitat for gopher tortoises. The tortoise constructs a long, permanent burrow for protection from predators and inclement weather and for egg laying. Tortoise burrows also serve as shelter for a number of commensal species (Carr 1952), including the Florida gopher frog and the eastern indigo snake.

Three major concentrations of gopher tortoise colonies are present within the Forest: along Middle Prong St. Marys, in the Deep Creek area, and in the Mt. Carrie area (see Fig. 20).

Short-Tailed Snake

This species is endemic to Florida. It occurs from Suwannee and Columbia to Hillsborough, Orange and Highlands Counties principally in longleaf pine-turkey oak plant associations. It is occasionally found in xeric oak hammock or sand pine scrub, but usually closely adjacent to longleaf pine-turkey oak stands (Campbell 1976).

Little is known of the life history and ecology of this species. It is a burrower, seldom seen above ground except in spring and fall (April and October), and appears to feed primarily on small snakes, especially crowned snakes. Concern for the short-tailed snake lies chiefly in its restriction to a rapidly disappearing habitat type.

No short-tailed snakes were found on the Forest during the FWS Study. The species has, however, been recorded near Lake City. Suitable high pineland habitat exists in small patches within the Forest, and the species may occur in these areas.

Suwannee Cooter

The Suwannee cooter occurs throughout the southeastern and south-central states. This turtle freely intergrades with an adjacent race, the Mobile cooter, where their ranges meet in the Florida panhandle. In Florida, the range of the Suwannee cooter includes the coastal waters of the Gulf of Mexico and the associated rivers from Pinellas County, north to Franklin County and to Columbia County, just west of the Osceola National Forest.

Swift-flowing spring runs, rivers and estuarine lagoons provide the Suwannee cooter's preferred habitat. This turtle reaches its greatest abundance in the turtle grass flats of river mouths, especially Suwannee Sound, at the Gulf of Mexico (Carr 1952).

Because of their shy nature, low population level and excellent swimming ability, no live Suwannee cooters were obtained during the FWS study. Large cooters, probably Suwannee cooters, were observed basking between White Springs and SR 6, but none were observed within the Forest.

Florida Gopher Frog

The Florida gopher frog ranges from central Georgia to the vicinity of Lake Okeechobee and westward along the Florida panhandle to Panama City. It inhabits well-drained, sandy soils, where it lives in gopher tortoise burrows. High pineland, scrub, and xeric hammock are the principal plant associations supporting both species. Within these habitats, gopher frogs (especially juveniles) occasionally utilize other types of burrows or cavities, such as burrows constructed by the old field mouse and burned-out stump holes.

A search of 10 major natural history museums revealed no specimens from the study area. Several small colonies of gopher tortoises exist within the Forest, but intensive trappings efforts at the mouths of their burrows failed to confirm the presence of gopher frogs. Suitable breeding ponds apparently are not available in the Forest. The species probably does not occur in the Forest.

Atlantic Sturgeon

The Atlantic sturgeon is anadromous, spawning in rivers and spending the rest of its life in the ocean. Two subspecies are recognized. The first, eastern Atlantic sturgeon *(A. o. oxyrhnchus)*, ranges from Labrador to at least the St. Johns River in Florida. The second, the Gulf of Mexico or western Atlantic Sturgeon *(A. o. desotoi)*, occurs from the mouth of the Mississippi River to

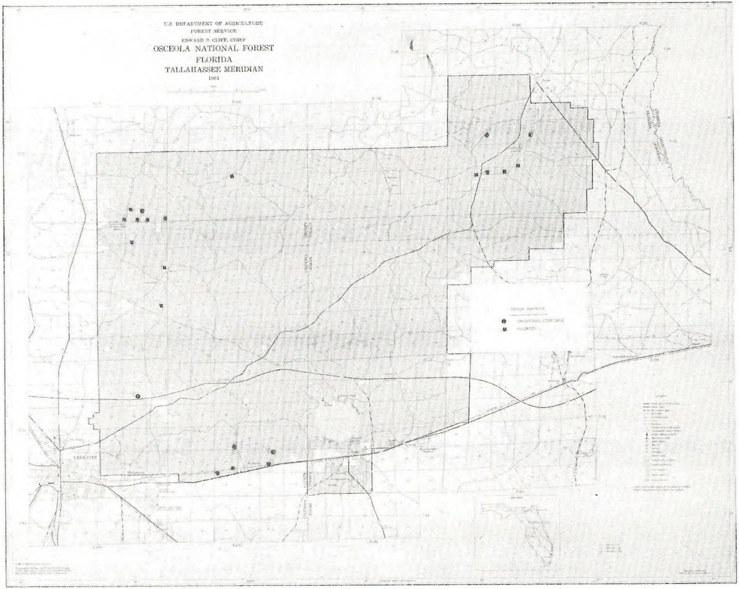


Figure 20. Gopher Tortoise Sightings and Colony Locations

Tampa Bay, although formerly it probably occurred further west and south of these points (Gilbert 1976d).

Sturgeon ascend the Suwannee River in March and return to the Gulf in November (Huff 1975). The exact location of spawning sites in the Suwannee is not known, but the sites are believed to lie between Ellaville and White Springs, and possibly further upstream during high waters (Huff 1975). Related species and the eastern subspecies are known to spawn over shoal areas (hard bottom and running water). Eggs become strongly adhesive within an hour or less of release and attach to rocks and other objects on the bottom (Huff 1975). Suitable substrate conditions exist in the Suwannee River above Ellaville as far upstream as White Springs. Adult sturgeon have been observed near Ellaville during the spring and summer months (Huff 1975).

3. Forage (No change)

4. Timber (Insert under paragraph 1 of original section, pg. II-42)

In addition to thinnings, approximately 1.2% of the Forest is scheduled for regeneration each year by clearcutting, seedtree and shelterwood methods. This involves preparing the surface soil on pine sites by chopping, discing, and bedding to improve seed germination and seedling survival. No hardwood types are scheduled for regeneration in the current 10-year timber management plan.

5. Recreation (No change)

6. Land Uses and Improvements (No change)

7. Human Population Patterns and Considerations (No change)

C. AESTHETICS (No Change)

D. HISTORICAL AND ARCHAEOLOGICAL VALUES (No Change)

E. HIGHLY SENSITIVE AREAS (No Change)

CHAPTER 3

ENVIRONMENTAL IMPACTS

This section discusses impacts in the unmitigated or worst case condition.

Add the following:

As stated in Chapter I, the purpose of this supplement is to identify environmental impacts which would result from issuance of leases on 52,000 acres. Since potential phosphate deposits have been identified on only 28,000 acres, the latter acreage was considered a reasonable basis for calculating impacts in most cases. Should a greater acreage be mined, impacts would generally increase.

Ecological Interrelationships

A. NON-LIVING COMPONENTS

1. Geology (Replaces fifth paragraph of original section, plus footnote, pg. III-1)

Processing will separate the matrix into three components. The first component (about one-third of the matrix) will be marketable phosphate. The second component (about one-fifth of the matrix) will consist of colloidal material (slimes) which would be disposed of in mined-out areas on the private lands. Slimes are stored above ground. Both slimes and the phosphate matrix contain approximately the same concentration of radium 226 (8.6 picocuries per gram (pCi/g), as reported be Environmental Protection Agency, Final Environmental Impact Statement (EPA 90419-78-020, September 1978) Occidental Chemical Company Swift Creek Chemical Complex, Hamilton County Florida. Companion Summary Document, pg. 112.). However, prior to mining the matrix is "shielded"by overburden. Slimes, on the other hand, when stored are at the soil surface and thus increase the surface radiation levels. Since the slimes will be stored off the Forest, it is expected that surface radiation levels within the Osceola will be increased from this source. Slime ponds off the Forest will increase surface radiation in those areas.

2. Mineral Resources (No change)

3. Soils

Developmental Drilling (Adds the following to original section, pg. III-3):

Drill holes on a multi-acre spacing will not have a significant impact.

Mining (No Change)

Erosion and Sedimentation (Delete all but the first paragraph of the original section, pg. III-2, and add the following)

In Forest streams, some increased sediment load can be expected, with resultant sediment deposition in channels. However, this impact is anticipated to be negligible if proper mining practices are used.

Flooding and Sedimentation (Replaces original section, pg. III-2)

Flood waters from tributaries of the Suwannee could inundate and erode dikes and create spillage of sediment and slime pond materials into flood waters, thereby polluting the Suwannee River.

Ore Processing (No change)

Fertilizer Manufacture (No change)

After Mining (No change)

4. Water Resources

It is assumed that off-Forest beneficiation would produce area effects similar to those outlined in Chapter VIII alternative B.5. of this supplement. (Computations of on-Forest versus off-Forest beneficiation of matrix and the changes required in assumed surface acreage of lakes show differences in estimated water budgets of 2 percent. Differences of this magnitude are within the estimating variation outlined in GS WRI 78-6. For example, water budget estimates in GS WRI 78-6 give annual Forest surface water yield of 11 to 13 inches, a 15% range.) It must be recognized that the following impacts are only estimates. Refer to Chapter VIII alternative B.5. for an account of how these estimates were made.

a. Watershed (Adds new material)

Replace table on pg. III-4 with Table 8.

b. Hydrology (Delete second paragraph of the original section (beginning "During the mining.."), pg. III-4. This information has been replaced by the new paragraph under Water Resources, above.)

c. Water Quality and Water Usage (Replaces paragraphs 11 (beginning "Radium emissions.."), 12,13, and 14 of the original section, along with footnote [4]' on pg. III-5)

Of the radioactive elements normally discharged in liquid effluents by the phosphate mining and milling industry, radium 226 is generally considered the most hazardous from a public health standpoint. The EPA has established 5 picocuries per liter (pCi/L) as the maximum allowable radium concentration in drinking water.

Of 24 Municipal wells surveyed in Polk County, Florida, (Central Florida phosphate area) by the EPA, none had radium levels above the 5 pCi/L limit. Of 36 privately owned wells surveyed in the same Polk County study, 6 had radium concentrations above the 5 pCi/L limit with a high of 15 pCi/L. These concentrations were due primarily to the seepage of radioactive gypsum pond water into the ground water. (Effects of Phosphate Mineralization and the Phosphate Industry on Radium 226 in Ground water in Central Florida, USEPA 1977 EPA/520-6-77-010.)

Further, it is not expected that ground-water contamination from this source will be as serious in North Florida as it is in Central Florida, because the underlying geologic materials are such that seepage will not readily occur (0 to 4 inches per year).

Gypsum pond water is produced during phosphate chemical processing. Neither the proposal nor any of the "issuance of leases"alternatives contains chemical plants. Gypsum ponds, therefore, will not be produced.

~~d. Ground-Water Hydrology~~

In this section the following changes should be made:
—replace "non-artesian aquifer"or "shallow aquifer"- with "surficial aquifer"
—replace "secondary artesian aquifer"with "Hawthorn Confining Unit"

In original section, pp. III-5—III-6, delete paragraph 2 ("Pits as large.."). Replace paragraph 3 (Mining pits..") and paragraph 5 ("Throughout most.."). Delete paragraph 7 ("Withdrawals..") and replace paragraph 8 ("The potentiometric surface..").

Mining pits would intersect the surficial aquifer. The pits might intersect unknown sinkholes and other karst features that may be connected to the Floridan aquifer.

Throughout most of the area, the natural water table of the surficial aquifer is higher than the potentiometric surface of the Floridan aquifer and it recharges the Floridan aquifer by downward leakage of 0 to 4 inches per year through the underlying confining beds. This downward leakage constitutes a relatively insignificant contribution to the water budget of the Floridan aquifer.

The potentiometric surface of the Floridan aquifer in the area would be depressed below present levels, depending upon well spacing, location, and pumping rates. This lowering would be less than 5 ft. at Lake City, Taylor, and White Springs, based on estimates made in GS WRI 78-6. Additional information on the impacts of existing phosphate operations in Hamilton County can be found in GS WRI 78-6, pp. 99-123.

5. Climate (microclimate) and Air Quality (No change)

B. LIVING COMPONENTS

FWS Report (Mar. 78) calculated impacts to vegetation on the assumption that the entire 52,000 acre lease application area would be affected. In preparing Int. FES 74-37 and supplement, it was considered more reasonable to assume mining would occur only on the 28,000 acres of potential phosphate deposits (23,500 acres under lease application and 4,500 acres outside of the lease application areas). For this reason, impacted vegetation estimates in FWS Report (Mar. 78) have been adjusted to be consistent with the FES description of the proposed action.

1. Vegetation

(This supplement adds the following material at the end of the Vegetation Impacts in the FES, pp. III-7—III-8.)

Impacts to specific vegetation types and phases are as follows:

High Pineland

~~Of the 1,225 acres of high pineland in the Osceola~~ National Forest, about one-seventh is over potential phosphate deposits. This high pineland type would be eliminated during surface mining.

Pine-Palmetto Flatwoods (Pine Flatwoods)

During mining operations about one-fifth of the pine-palmetto flatwoods type would be eliminated. The drainage of flatwoods into adjacent mining operations may lower the water table of the surficial aquifer in certain unmined areas, and thus possibly alter this vegetative type.

After mining, approximately one-third of the mined area would be reclaimed as lakes and ponds. This would

TABLE 8--Watershed Area within the Osceola National Forest Affected by Potential Phosphate Mining

Osceola National Forest

Watershed	Acres Watershed Area	Acres Phosphate Deposits	% Watershed Affected by Potential Mining	Miles Bisected Streams
Deep Creek	41,990	16,700	39.8	22.6
Robinson Creek	13,325	2,925	22.0	3.3
Falling Creek	15,795	4,450	28.2	5.6
Middle Prong St. Marys	77,427	4,725	6.1	---
Total	148,537 1/	28,800 2/	--	31.5

1/An insignificant amount of phosphate deposits has been found in the Olustee and Cedar Creek watersheds.

2/Includes those private land holdings within the National Forest having potential phosphate deposits.

NOTE: Of the 71,110 acres of area tributary to the Suwannee River (Deep Creek, Robinson Creek, Falling Creek), the total percentage watershed area affected by mining (24,075 acres) is 34%.

reduce the area of vegetation left to be reclaimed, presumably as flatwoods.

Cypress Swamps

The major impacts to the pond cypress-blackgum phase would occur in Big Gum Swamp and Impassable Bay. Some one-fifth of the phase within these two areas has potential phosphate deposits and will be lost if mining is carried out.

The bald cypress-blackgum-ash phase is in Impassable Bay. Few of the total potential phosphate deposits are in Impassable Bay; therefore, the effects of mining on this phase would be minimal. However, ground water discharge from Impassable Bay into the adjacent mined areas might partially drain this phase.

Most of the pond cypress-slash pine phase is concentrated in the western portion of the forest, where the bulk of the potential phosphate deposits are located. Therefore, much of this phase would be eliminated by mining.

Cypress domes scattered throughout the area to be mined would be eliminated.

The actual mining, disruption of surface drainage, and dewatering of the surficial aquifer are the main threats to the larger swamps. Any dewatering as a result of mining could dry out these areas, making them more vulnerable to fire.

It is estimated that mining will lower the water level of the surficial aquifer within a 300-400 ft. radius around the mine pits.

Bay Swamps

Potential phosphate deposits lie under approximately one-fourth of the mixed bay swamp phase. Less than 5% of the fetterbush phase is over potential phosphate deposits, primarily in Big Gum Swamp.

Those areas of bay swamp (both phases) that are mined would be eliminated, and would require a long period of time to be restored to pre-mining condition, if they can be restored at all. It is also likely that mining adjacent to bay swamp types would affect surface waters in the swamps. Based on observations at the Occidental Mine, mine-pit pumpage of surface waters might cause a dewatering of the surficial aquifer in adjacent areas to a distance of 100m (328 ft.) from the mine pit areas.

River Systems (Creek Swamps And Hammocks)

The greatest adverse effect of mining on this vegetative type would be to the creek swamp phase. Of the 1,340 acres of this phase present in the Forest, about three-fifths are over potential phosphate deposits, all of them in the Deep Creek drainage area. Creek swamps in Middle Prong St. Marys would not be directly affected by mining. The Deep Creek stringer of creek swamp lies in the middle of the Forest's potential phosphate deposits; if mining were allowed here, most of this phase would be eliminated.

The Aquatic Community

Phosphate mining in the Osceola National Forest is not expected to have any impact on Ocean Pond; however, such existing minor aquatic types as borrow pits and excavated stream channels at road crossings would be considerably altered.

One-fifth of Watertown Lake lies within the lease application area, and in close proximity to known phosphate deposits. No mining would occur in the lake and therefore the water quality of the lake would not be affected.

Endangered Plants

Although none of the following species were actually found in the Osceola, suitable habitat does exist and could be adversely impacted by the proposed action:

Chapman's rhododendron, *Rhododendron chapmanii*—Approximately one-seventh of the Forest's high-pineland and one-fifth of the Forest's pine-palmetto flatwoods would be eliminated by phosphate mining. Therefore, mining could adversely affect this endangered shrub.

Andropogon arctatus—Approximately one-fifth of the Forest's pine-palmetto flatwoods would be eliminated by phosphate mining; therefore, mining is a potential threat to this little-known grass.

Balduina atropurpurea—Although this species may possibly occur in boggy portions of the Forest adjacent to cypress and creek swamps, at this time phosphate mining is not considered to be a threat to it.

Florida willow, *Salix floridana*—This species is apparently absent for the Osceola National Forest and should not be affected by the proposed phosphate mining.

West's flax, *Linum westii*—Although West's flax was not recorded in the Osecola, what little is know of its ecological requirements suggests that the extensive wetlands in this area could provide an optimal habitat. Therefore, mining of wetland areas may eliminate potential habitat for this species.

Whitlow wort, *Paronychia rugelii* var. *interior*—For this species very little potential habitat exists in the Forest, and only a small share of that is within the lease application area itself. Phosphate mining, therefore, would have little effect, if any, on this species.

2. Wildlife and Fisheries

Delete paragraphs 4-6 of the original section, pg. III-8.

Information on the Florida black bear is now contained in the section on threatened and endangered species, below.

The following replaces in its entirety the threatened species discussion on pg. III-9.

It is possible to have significant adverse impacts to a particular species in a particular area without constituting jeopardy to the species as a whole. The FWS Biological Opinion concentrates on jeopardy to the continued existence of species. The impacts discussed in this section, however, may or may not constitute jeopardy to species.

Federal- and State-Listed Species:

Florida Panther

The entire Forest is potential habitat for the Florida panther. Approximately one-fifth of this area would be directly, adversely affected by mining activities. The impacts would include a loss of vegetative cover, a diminution of food supply, and a penetration of remote habitats by mining and associated activities. Even outside the potential phosphate deposits, the value of the western two-thirds of the Forest as panther habitat would be reduced by the segmentation of the Forest that mining would cause.

Manatee

Normal mining operations would not harm this species and no habitat loss, potential or actual, would be experienced. However, manatees could be harmed by any accidental release of toxic agents or clayey wastes into Deep Creek or Robinson Creek, which flow into the Suwannee River. Pollution of this sort may cause vegetation destruction and result in a loss of food resources, or else affect the manatee by direct contact. Considering the distance to the primary habitat of this species, the impact is expected to be insignificant.

Gray Bat

Although no gray bats were observed within the Deep Creek area during the course of the FWS study, this site could provide potential foraging habitat in wetter years. Loss of the creek and its attendant vegetation would remove the species' only presently suitable habitat in the western part of the Forest. The gray bat was not observed in nearby mining areas, and appears to prefer streams and stream vegetation; therefore, no beneficial impacts as a result of mining are anticipated even if additional lake type water areas are created.

Bachman's Warbler

Habitat requirements for the Bachman's warbler are so little known that it is difficult to assess mining impacts on the species. The larger bays and swamps in the Osceola may furnish feeding habitat during spring and fall migrations. Any modification of these areas may result in further loss of suitable habitat.

Bald Eagle

Since there is no eagle nesting, and extremely limited use of the area by eagles at present, no adverse impacts could be anticipated due to mining.

The creation of additional water areas, if they provided a food source, could be beneficial to the species, if sufficient trees were left in the vicinity of these water areas to provide suitable perching and nesting sites.

Ivory-Billed Woodpecker

The ivory-billed woodpecker requires river swamps with extensive mature stands of hardwoods and minimal human disturbance. These requirements are most closely provided by Deep Creek, Big Gum Swamp, Little Gum Swamp, and Impassable Bay. Alteration of these areas by mining or associated activities would destroy ivory-billed habitat, if, in fact, this species is still present in the area.

Arctic Peregrine Falcon

In Florida, the most commonly used migration and wintering habitats for this species are coastal areas that provide an abundance of prey species in an open environment.

There is no indication that peregrines presently use the Forest. Because of the habitat they prefer, it is unlikely that peregrines would use the habitat altered or created by mining activities. Therefore, no impact on this species is anticipated.

Red-Cockaded Woodpecker

Mining would cause the loss of approximately one-fifth of the pine-palmetto flatwoods habitat (longleaf pine and longleaf pine-slash pine phases) suitable to the red-cockaded woodpecker.

Thirteen of the 40 known red-cockaded woodpecker colonies are located within or immediately adjacent to potential phosphate deposits. Therefore, approximately one-third of the Osceola's total red-cockaded woodpecker population could be lost as a result of mining activities.

The FWS Biological Opinion (see Appendix 1) recognized that the loss of so many colonies from the Osceola National Forest would be likely to jeopardize the continued existence of an intergral segment of the Florida red-cockaded woodpecker population.

American Alligator

Mining would displace or eliminate alligators that inhabit existing roadside drains and borrow pits. In addition, runoff from mining areas could possibly have an indirect adverse effect on alligators due to loss of fish and other prey species in the altered habitats.

While lakes created as a result of surface mining activities may appear to be of potential benefit to the species, such areas could increase the exposure of alligators to illegal hunting.

The net effect on this species cannot be determined.

Eastern Indigo Snake

The eastern indigo snake is not restricted to any particular plant association; it occurs wherever there is ample food and cover.

Mining in the Osceola National Forest would eliminate indigo habitat in all areas actually mined and in areas developed for buildings, rights-of-way and other purposes.

The FWS study team found no eastern indigo snakes or records of their presence at the Occidental Mine, but stated that it is possible that abandoned mining areas may provide suitable habitat.

State-Listed Species:

Florida Black Bear

Although only about one-fifth of the Osceola National Forest would be mined, four-fifths of the known bears in the Forest would be directly affected. Cowhouse Bay, Otter Bay, Little Gum Swamp, Buckhead Swamp, Fanny Bay, Impassable Bay, and Big Gum Swamp are all significant refuge areas for bear, particularly during the hunting season. Mining in any of these areas would be damaging to the Osceola bear population. Mining in Big Gum Swamp and Impassable Bay (where bears tend to concentrate) would be particularly damaging. These two large swamps are used as feeding, breeding, and escape cover areas by 90% of the bears in the Forest. The area between the two swamps has a bear density of one bear per 3.5 km^2 (1.4 sq. mi.) compared to one bear per 14 km^2 (5.4 sq. mi.) for the total Forest. The bear population would be significantly reduced if mining were carried out in and around these two large swamps. Phosphate deposits surround 80% of the southern half of Impassable Bay and 40% of Big Gum Swamp, mainly on the southern and western sides. Mining would reduce the size of the swamps, eliminate adjacent feed and cover areas, interfere with movement patterns, and increase human access to the area. The resulting reduction of the bear population in the Osceola National Forest would leave only one major concentration of Florida black bear in public ownership in Florida (Apalachicola National Forest). This could seriously jeopardize the long-term survival potential of the species in the State.

Sherman's Fox Squirrel

Mining operations would have an adverse impact upon this species due to the removal of trees prior to mining. The direct result would be the loss of approximately one-fifth of the fox squirrel habitat in the Forest.

The majority of sightings (16 out of 19) during the FWS study occured outside the lease application areas, with concentrations primarily in the FS 278/US 90 and FS 235 areas. The construction of rights-of-way, and buildings, increasing the size of existing rights-of-way, the placement of overburden, and accidental spills from clayey wastes might result in a lowering of the quality of habitat and food resources for the FS 278 populations, and possibly the FS 235 populations as well.

Florida Sandhill Crane

Florida sandhill cranes have been observed in Impassable Bay and may use Big Gum Swamp. Alteration of these areas by mining activities could reduce the quality of the existing and potential habitat. Lakes created after mining, however, could potentially serve as feeding habitat for the species.

Osprey

Mining operations would increase the acreage of open water, and, as with eagles, potentially benefit the species, providing these new water areas would provide a source of food. Limited use by ospreys of Ocean Pond and Occidental Mine indicates that, at best, the existing natural and man-made water areas would be of marginal value to the species.

No adverse impacts are anticipated.

Southeastern Kestrel

Mined areas, if reclaimed to open, grassy habitats, would have both beneficial and adverse impacts upon this species. The bird's feeding habitat would be enhanced to some degree by the creation of openings in the Forest, but at the same time the species' nesting habitat (old woodpecker holes in dead trees) would be eliminated by mining operations.

It is highly questionable whether feeding habitat, in the absence of nearby nesting habitat, would be used to any great extent. The net impact on this species from surface mining operations would be adverse.

Present day timber production practices on private lands have virtually eliminated the presence of the old, dead trees that provide suitable nesting cavities, and this development is assumed to be a greater limiting factor than a shortage of feeding sites.

Wood Stork

Three-fifths of the creek swamp and much of the cypress dome wood stork feeding habitat will be eliminated by mining. Based upon studies of those areas where wetland reclamation was carried out at the Occidental Mine, it is doubtful whether a similar reclamation effort following phosphate mining in the Osceola National Forest would provide enough suitable habitat to sufficiently mitigate the loss of these natural areas.

Although a variety of aquatic habitats have been created at the Occidental Phosphate Mine, these are largely unsuitable for use by the wood stork. The settling ponds (active and inactive) have soft bottoms that do not provide adequate support for the birds, while the lakes created by reclamation generally are too deep and steep-sided for edge feeding. The unreclaimed mine was put to use, however, by a flock of 30 wood storks that was observed (in mid-April 1977) feeding on top of the water hyacinth mat floating on the water.

Gopher Tortoise

Several gopher tortoise colonies are located over potential phosphate deposits; the largest concentration occurring near Deep Creek.

Aufenberg and Franz (in prep.) state, "Extensive mining operations in central Florida have destroyed thousands of acres of suitable habitat" The same is expected to occur to those tortoise colonies on the Osceola if mining occurs.

Gopher tortoises probably cannot recolonize an area which has been mined, as indicated by their absence on the Occidental Phosphate Mine and other phosphate mines in central Florida. Therefore, phosphate mining would probably extirpate the gopher tortoise from mined areas with the Osceola.

Short-Tailed Snake

No short-tailed snakes were recorded during the FWS study.

If the short-tailed snake is present in the Forest it would be eliminated in areas that are mined. In view of the small sizes of the available habitat units, the construction of roads, pipelines, powerlines, etc. through those units could also have an adverse effect.

Suwannee Cooter

Since it occurs in the Suwannee River west of the Osceola National Forest, the Suwannee cooter is vulnerable only insofar as the potential for slime spills is concerned. A major spill in the Peace River and Whidden Creek of central Floride destroyed considerable habitat and wildlife downstream for a distance of 119 km (45.9 miles) (Chapman 1973). A major slime spill in the Suwannee River during a period of minimum discharge could drastically reduce the already limited vegetation upon which the Suwannee cooter feeds. Presumably, turtles from unaffected sections of the river, could recolonize, depending on water flow and turtle immigration rates.

Florida Gopher Frog

No evidence was found during the FWS study that this species occurs in the Osceola National Forest or along the Suwannee River. It is unlikely, therefore, that phosphate mining in the Osceola would have any impact on the species. If the Florida gopher frog does occur along the Suwannee, its micro-habitats (tortoise burrows on the natural levees and breeding ponds some distance from the river) should be secure from even major slime spills.

Atlantic Sturgeon

Phosphate extraction in the Osceola would not have any impact on Atlantic sturgeon populations or their habitat, unless, through a major accident, clayey wastes were released into tributaries of the Suwannee River.

A clayey waste spill into the Suwannee drainage system could, by smothering eggs and larvae, wipe out most of the reproductive effort of the Atlantic sturgeon. Adult sturgeon would also be killed if they were in the vicinity of the spill.

Alteration of the existing water regimen of the river during the reproductive stages of the sturgeon could have adverse effects on the species.

3. Forage (no change)

4. Timber (No change)

5. Recreation (No change)

6. Land Uses and Improvement (No change)

7. Human Populations and Considerations (No change)

C. AESTHETICS (NO CHANGE)

D. HISTORICAL AND ARCHEOLOGICAL VALUES (NO CHANGE)

E. HIGHLY SENSITIVE AREAS (NO CHANGE)

CHAPTER 4

MITIGATING MEASURES

The following replaces the first paragraph of Chapter IV, pg. IV-1:

If the leases are issued, all Federal, State and local laws and regulations that pertain to or could relate to phosphate mining and its associated effects on the socio-economic and natural environment would apply and be enforced; e.g., Executive Order(s) 11988 Floodplain Management and 11990, Protection of Wetlands. Those mitigating measures not covered by existing laws and regulations would be included as terms and conditions of the lease(s).

A. NON-LIVING COMPONENTS

1. Geology (No change)

2. Mineral Resources (No change)

3. Soils (No change)

4. Water Resources

General—Water Quality Rules (Delete paragraph 2 of the present section (beginning "Section 17-304..") and replace the last paragraph (beginning "The Florida Rules..") and its accompanying footnote with the following)

State of Florida Rules allows for exception to limitation of discharges in cognizance of the fact that certain waters of the State, due to natural causes, may not fall within natural or prescribed limitations (Section 17-3.05(4)), State of Florida Rules—Pollution of Water, Chapter 17-3, Supp. No. 81). For example, in 40 CFR Part 436, Mineral Mining and Processing Point Source Category Standard of Performance of New Sources (43 CFR 9808, March 10, 1978), the discharges of process generated waste water and mine dewatering discharges shall not exceed the limitations shown in Table 9, except for precipitation occurrences greater than the estimated 10-year 24-hour precipitation event. Rules now in draft allow the State to issue variance to mixing zone specifications when there is not practicable means known or available for the adequate control of the pollution involved (Section 17-4.244(8) Florida Department of State, 1978. Rules of the Department of Environmental Regulation, water quality standards, Chapter 17-3 in Florida Administrative Code: Tallahassee (in hearing)).

Federal Regulations require that each Federal agency conducting any action will meet the substantive and procedural standards of water quality rules of the Federal, State and/or local adminstrative authorities (PL 95-217, "The Clean Water Act").

Watershed, Hydrology, Quality

Replace footnote [1] in paragraph 6 (beginning "Earthen dikes..") of the original section, pg. IV-2, with the following:

[1] Rules of the Department of Environmental Regulation, Chapter 17-9, Minimum Requirements for Earth Dams, Phosphate Mining and Processing Operations Supp. No. 82. (Use this same footnote to replace footnote [1] on pg. IV-5.)

Replace paragraph 7 (beginning "Water quality..") of the original section pg. IV-2, with the following:

During any mining, water quality monitoring will be conducted by the lessee to determine whether adminstrative controls are providing adequate fulfillment of Forest water management objectives and legislative responsibilities. The Forest Service will maintain approval authority and administrative control of any monitoring conducted on Federal property outside the mined area and under the administrative authority of the Department of Agriculture.

Add new paragraph to end of section:

The potential for sinkhole development does exist within and adjacent to the Forest. Prior to any development of surface water bodies, the presence or absence of sinkhole— related geology must be determined by a qualified geologist with appropriate experience in identifying potential sinkhole areas.

Ground Water

In this section the following changes should be made:

—replace "non-artesian aquifer"or "shallow aquifer"- with "surficial aquifer"

—replace "secondary artesian aquifer"with "Hawthorn Confining Unit"

TABLE 9--Effluent Characteristics and Limitations of Process Generated Waste Water and Mine Dewatering Discharges*

Effluent characteristics	Effluent limitations	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed-
Total suspended solids.....	60 mg/l......	30 mg/l.
pH........................	Within the range 6.0 to 9.0.	

*From 43 FR 9809, March 10, 1978.

5. Climate (microclimate) and Air Quality (No change)

B. LIVING COMPONENTS

1. Vegetation (No change)

2. Wildlife and Fisheries (Replaces original section, pp. IV-4—IV-5)

If mined areas can indeed be restored to their original vegetative composition, one can expect most common (non-endangered) species in adjacent unmined habitats to recolonize these areas. This would be helped by leaving existing vegetation on all areas not actually being mined. These areas would serve as remnant population centers for some species and hasten the recolonization process.

When considering the mitigation of impacts, certain species can be grouped together because of similar habitat requirements, location, or possible mitigation measures.

Florida Manatee, Suwannee Cooter, and Atlantic Sturgeon

None of these species is found within the Osceola National Forest, and no direct impacts from loss of habitat through mining are anticipated. All the species, however, are inhabitants of the Suwannee River and its tributaries, and therefore could be affected by changes in surface-water quality resulting from mining operation discharges or from accidental spills of pollutants.

Adverse impacts on water quality by normal operational activities could be detected by the monitoring of discharges and corrected by appropriate changes in the mining operation. Further, the proper control of such discharges and effluents would lessen the possibility of harmful alteration to the water regime of the river.

Although an intensive dike inspection program would reduce the possibility of an accidental spill, the potential for a major spill could not be entirely eliminated. The sites selected for mine waste storage should be located as far away from drainage systems as possible; thereby reducing the amount of material entering the water in the event of an accidental spill. Minor dike erosion will occur, but sediment can be controlled by retention dams and catchment basins.

Bald Eagle and Osprey

These two species have similar habitat preferences and requirements. Use of the Osceola National Forest by eagle and osprey is negligible, and the effects of mining on these species could be anticipated to be minimal.

Suitable nest and perch trees should be left in close proximity to open bodies of water to facilitate the use of these areas for potential nesting if a source of food (fish and waterfowl) can be established.

Arctic Peregrine Falcon

No mitigating measures are necessary.

Florida Panther, Florida Black Bear, Florida Sandhill Crane, Bachman's Warbler, and Ivory-Billed Woodpecker

Impassable Bay and Big Gum Swamp are probably essential to the continued existence in the Forest of the Florida panther, and any activities that would alter the present condition of the swamps could permanently eliminate the species from the area. The only means of mitigation is to exclude mining activities from these areas.

Mining activity in the Forest would eliminate bear habitat in parts of Cowhouse Bay, Otter Bay, Little Gum Swamp, Buckhead Swamp, Impassable Bay and Big Gum Swamp. Most of the damage will be avoided, however, by excluding mining from the latter two areas.

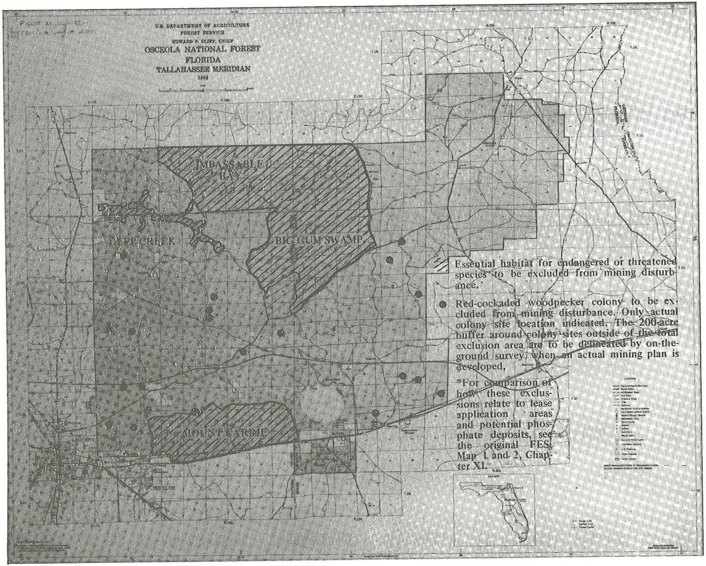
Impassable Bay and Big Gum Swamp are habitat for the Florida sandhill crane and may possibly be used by the Bachman's warbler and ivory-billed woodpecker. Although some mitigation of the impact on Florida sandhill cranes will be accomplished by not mining open areas, mitigation for the other species will be accomplished only by the exclusion of mining from the two large swamp areas.

Gray Bat

Potential adverse impacts to the gray bat will be eliminated by the exclusion of mining from Deep Creek and its adjacent creek swamp vegetation as indicated in Fig. 21. Precise determination of the creek swamp habitat must be made by an on-the-ground survey during the development of specific mining plans.

Red-Cockaded Woodpecker and Sherman's Fox Squirrel

Adverse impacts to the red-cockaded woodpecker and Sherman's fox squirrel will be partially mitigated by implementing the FWS Biological Opinion recommendations for red-cockaded woodpecker management (see Appendix 1). Among other things, these recommendations call for the exclusion of mining activity from the red-cockaded woodpecker concentration area south of FS road 278, and from a 200-acre area surrounding each active colony site within the areas to be mined.



▨ Essential habitat for endangered or threatened species to be excluded from mining disturbance.*

● Red-cockaded woodpecker colony to be excluded from mining disturbance. Only actual colony site location indicated. The 200-acre buffer around colony sites outside of the total exclusion area are to be delineated by on-the-ground survey, when an actual mining plan is developed,

*For comparison of how these exclusions relate to lease application areas and potential phosphate deposits, see the original FES, Map 1 and 2, Chapter XI.

Figure 21. Essential Habitat Areas* to be Excluded from Mining and Associated Activity

Southeastern Kestrel

Impacts on this species can be mitigated by leaving existing and potential nest cavity trees adjacent to open areas that may be reclaimed to grassy vegetation.

American Alligator

Mitigation measures for the American alligator will include the following: creating water retention areas with shallow, gradually sloping sides; limiting public access to these areas; reducing stream and pond sedimentation; and protecting the species from poaching through information and education programs.

Eastern Indigo Snake

The only effective mitigation measure for the eastern indigo snake is the restoration of mined areas as soon as possible after mining.

Wood Stork

Adverse impacts on this species will be minimized considerably, if not completely eliminated, by the exclusion of mining activities from creek swamps and cypress domes. Even if mining were not excluded from these areas, stipulations discussed below could be applied to offset some of the loss of these habitats.

At the Occidental Mine, low wood stork usage of the mined and reclaimed areas was attributed to two factors: soft substrate in the settling ponds and steep-sided banks along the perimeters of the mined areas.

Probably little or nothing can be done to alter the composition of the bottoms of the settling ponds to make them acceptable for wood stork usage, but the banks of the mined areas (which would have a hard substrate) could be altered to produce the shallow water depths of 1½ ft. or less that provide suitable feeding areas for the birds. To maximize the potential habitat for wood storks and other water birds, a large number of small ponds would be preferable to a small number of larger water areas. The larger number of ponds will increase the areas of pond "edge"available to the birds. Water control structures, if feasible, would permit drawdowns of the ponds to simulate natural conditions that concentrate the wood stork's food supplies.

Gopher Tortoise and Short-Tailed Snake

Adverse impacts on these species can be partially mitigated by excluding mining operation from the Deep Creek gopher tortoise concentration area. (The area provides suitable habitat for the short-tailed snake as well.) The area is shown in Fig. 21.

Florida gopher frog

No mitigation measures are necessary.

Fisheries (No change)

3. Forage (No change)

4. Timber (No change)

5. Recreation (No change)

6. Land Uses and Improvement (No change)

C. AESTHETICS (No change)

D. HISTORICAL AND ARCHAEOLOGICAL VALUES (No change)

E. STIPULATIONS

SECTION 1. GENERAL

(A) Applicability of Stipulations (No change)

(B) Changes in Conditions (No change)

(C) Monitoring Program (Replaces paragraph 1, pg. IV-6)

After a mining and reclamation plan is approved by the U.S. Geological Survey, the lessee will be required to conduct an environmental monitoring program approved by the Authorized Officer and the U.S. Geological Survey. The environmental monitoring program will be designed to provide continuing information regarding compliance with these Stipulations. All Federal, State and local regulations will be met, and appropriate sampling requirements will be included in the monitoring program. The program will evaluate environmental quality of land, water and biologic systems adjacent to the mining operation and within the National Forest boundary. Monitoring will include evaluation of radiological effects. The lessee will give timely notice to the Authorized Officer and U.S. Geological Survey regarding detrimental effects, conditions that require correction, and variations in the monitoring program.

(D) Additional Stipulations (No change)

SECTION 2. ACCESS AND SERVICE

FACILITIES (No change)

SECTION 3. FIRE PREVENTION AND CONTROL (No change)

SECTION 4. FISH AND WILDLIFE

(A) Management Plan (No change)

(B) Mitigation of Damage (No change)

(C) Wildlife (Adds to the original stipulations, pg. IV-7)

1. Exclude mining and associated activities from the essential habitat areas of endangered and threatened species as follows (see Fig. 21):

   a. Deep Creek and the creek swamp vegetative type associated with this area (includes the gopher tortoise concentration area discussed above);

   b. Impassable Bay and Big Gum Swamp, as shown in Fig. 21;

   c. Red-cockaded woodpecker concentration areas south of FS road 278; and

   d. A 200-acre area to protect and provide for the habitat needs of each existing, and any later discovered, red-cockaded woodpecker colonies (area to be determined on-the-ground by the Authorized Officer).

2. Leave vegetation undisturbed in areas not essential to mining or related activities. Attempt to make these areas as continuous as possible and correspond to natural vegetative boundaries.

3. Create a mixture of large and small water areas with irregular shapes. Each area should combine gradually sloping and steep-sided edges. Limit public access to these areas in order to protect threatened or endangered species.

4. During reclamation, attempt to restore current vegetative types and their relative distribution.

5. Maintain forest diversity by providing alternate vegetative communities for those that cannot be restored.

6. Leave groups of suitable mature trees close to large open water areas to encourage their potential use by bald eagle and osprey. (Trees to be left are to be determined by the Authorized Officer.)

(D) Fish Migration (No change)

(E) Fish Spawning Areas (No change)

SECTION 5. HEALTH AND SAFETY (No change)

SECTION 6. HISTORIC AND SCIENTIFIC VALUES (No change)

SECTION 7. PESTICIDES AND HERBICIDES (No change)

SECTION 8. POLLUTION—AIR

(A) Air Quality (No change)

(B) Dust (No change)

(C) Radioactive Pollution (Replaces original stipulation, pg. IV-8)

Radioactive by-product levels will be reduced to meet the EPA recommended standards.

SECTION 9. POLLUTION—WATER

(A) Water Quality (Add the following paragraph to original section, pg. IV-8)

The lessee will allow water to leave the lease area only if the quality of such water is within the Class III criteria as defined by the State of Florida Rules.

(B) Disturbance of Existing Waters (No change)

(C) Control of Waste Waters (Replaces original stipulations, pg. IV-8)

In areas where overburden, water or waste from mined areas might contain toxic, saline materials or other undesirable constituents as defined by the Authorized Officer, the lessee shall (consistent with "A"and "B"above):

1. *Divert* surface water flows and pumped ground water discharges around mining and processing operations. These waters shall be routed to the lower reaches of the dissected stream to insure that the quantity and quality of the downstream waters are sustained.

2. *Reclaim* the affected area (mined-out lands) upon termination of the operation, consistent with ecological principles and safety requirements, to minimize changes in water quality and prevent a greater than 10% change in flood flows of the annual 1-day high flow.

3. *Monitor* water, spoil, and refuse for the presence of materials that are likely to degrade existing water quality. Streamflow gauging stations will be installed to assess potential changes in surface flood flows, and control sections may be installed to regulate streamflow.

(D) Cuts and Fills (No change)

(E) Streams (No change)

(F) Road and Surfacing Material (No change)

(G) Radioactive Pollution (Replaces original stipulation, pg. IV-9)

Prior to the discharge of any waters, radiation levels must be reduced to meet the standards recommended by EPA for safe drinking waters.

SECTION 10. POLLUTION—NOISE (No change)

SECTION 11. REHABILITATION (No change)

SECTION 12. SCENIC VALUES (No change)

CHAPTER 5

ADVERSE IMPACTS THAT CANNOT BE AVOIDED

The following replaces the first paragraph of Chapter V, pg. V-1:

This section discusses the residual adverse impacts of mining 28,000 acres. These adverse impacts can be expected after all mitigation measures have been applied. It is assumed that all State of Florida regulatory controls will be followed, both within the National Forest and on adjacent beneficiation operations. Five thousand acres of wildlife habitat within the potential phosphate deposit area are to be excluded from mining operations. It is reasonable to assume that reducing the total acreage to be mined will differentially reduce the identified impacts. Only when detailed showings of findings are presented and specific mining plans filed can the impacts be accurately quantified.

A. NON-LIVING COMPONENTS

1. Geology (No change)

2. Mineral Resources (No change)

3. Soils (No change)

4. Water Resources (Replaces original section, pg. V-1)

During mining, the potentiometric surface of the Floridan aquifer would be lowered less than 5 feet at Lake City, White Springs and Taylor due to the pumping of water for ore beneficiation. However, due to the complexities involved in estimating this potential drawdown, the potentiometric surface of the Floridan aquifer may not be lowered at White Springs or the center of Lake City (GS WRI 78-6, pg. 145). Also, these computations were based on a pumping center at sites A and B in Fig. 22, which are 2.7 and 6.3 miles east, respectively, of the western Forest boundary. Ground water withdrawals west of the Forest could produce significantly different drawdowns.

The surficial aquifer will be disrupted in mined areas. The water table in the aquifer probably would not be lowered in unmined areas except in those areas immediately adjacent to a mining pit (within 300 to 400 feet, based on an estimate made by observation at Brewster Mine in Central Florida and Occidental Mine in Hamilton County, North Florida). At the conclusion of mining, in mined areas the depth to the water table in the surficial aquifer, as well as its annual fluctuation, probably would be increased. Such changes after mining could lead to the development of a different forest species mix than that which is now present in the Osceola.

If the watersheds were mined, the watersheds and their drainage networks within the Forest would be totally disrupted, affecting an estimated 31.5 miles of streams. These disturbances could not be avoided, and some erosion and sedimentation would occur along existing and newly created channels.

If all mine discharges were channeled into Robinson Creek, its average annual flow would be increased, and stream chemistry would change in accord with the values presented in Table 14, Chap. VIII of this supplement.

5. Climate and Air Quality (No change)

B. LIVING COMPONENTS

1. Vegetation (No change)

2. Wildlife and Fisheries (Replaces original section, pg. V-2)

Terrestrial habitat will be reduced and replaced by aquatic habitat, thereby reducing the carrying capacity of the Forest for terrestrial species and causing a subsequent reduction of their numbers.

Another unavoidable effect would be an increase in human activity due to mining and associated operations. This would severely limit use of the western half of the Forest for many species while mining was in progress. In addition, the area would receive increased pressure from recreationists using the lakes constructed as a by-product of the mining operations. This would be an unavoidable impact on species intolerant to human disturbance.

In the case of fisheries and aquatic fauna, unavoidable effects may result from changes in water quality due to mining activity.

Areas to be excluded from mining would protect habitat essential or most suited for several threatened or endangered species, but occasionally these species may also use habitats which are outside exclusion areas. Mining of these areas would be an unavoidable effect not mitigated by excluding those other areas.

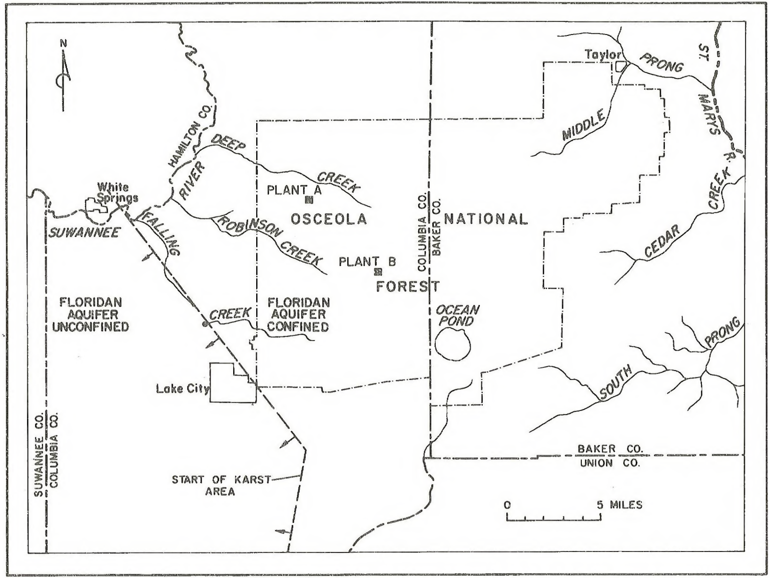


Figure 22. Location of Potential Plant Sites and Contact Between Unconfined and Confined Parts of the Floridan Aquifer.

From GS WRI 78-6, pg. 140.

ADVERSE IMPACTS

Florida Manatee, Suwannee Cooter, and Atlantic Sturgeon

With proper monitoring and control of water quality, the only adverse impact would be an accidental spill.

Such an occurrence could be detrimental to downstream populations. Considering the distance to the primary habitat of the manatee, this impact is expected to be insignificant. Concerning the Atlantic sturgeon and the Suwannee cooter, it is not possible to quantify this impact, due to the variables of seasons of the year, type and magnitude of spill, and flow stage of the river.

Bald Eagle, Osprey

No adverse impacts.

Arctic Peregrine Falcon

No adverse impacts.

Florida Panther

Segmentation of habitat and increased human disturbance would reduce the value of the Forest for panther, even with the exclusion of mining from its major refuge areas in Impassable Bay and Big Gum Swamp, which comprise the connecting corridor to further remote areas to the north, including the Okefenokee National Wildlife Refuge.

Florida Bear

Even with exclusion of mining from the major use areas, there will be a degradation in the value of the Forest as bear habitat, and the present carrying capacity of the Forest for bear will probably be reduced.

Sandhill Crane, Bachman's Warbler, Ivory-Billed Woodpecker

After excluding mining from Impassable Bay and Big Gum Swamp, there would not be any adverse impacts that could not be avoided.

Gray Bat

By excluding mining from Deep Creek and its adjacent vegetation, there should not be any adverse impacts that cannot be avoided.

Red-Cockaded Woodpecker

Even with the exclusion of mining from the major red-cockaded woodpecker concentration area and a 200-acre area for each of the other individual colony sites, there will be some adverse impacts to the species. Mining outside of these areas will interrupt the continuity of the Forest, limiting opportunities for population expansion. The actual size, shape, and total area of individual colony home ranges is unknown. Therefore, some sites selected for 200-acre exclusion might subsequently be abandoned by woodpeckers because of the inadvertent elimination of portions of essential home range area. It is impossible to predict the number of colonies that may be affected by these factors.

Sherman's Fox Squirrel

During mining, about one-fifth of the Sherman's fox squirrel habitat will be lost. Lack of sufficient population data does not permit direct correlation between habitat loss and possible population loss. If the mined areas can be reestablished to existing habitat conditions, it is believed that this species will recolonize the area.

Southeastern Kestrel

Some reduction in numbers may occur due to initial habitat loss on mined areas. However, if existing and replacement nest trees are left, this reduction would be small.

American Alligator, Eastern Indigo Snake

There will be a disruption, displacement, and loss of a segment of the existing population. The potential for increased human depredation is increased.

Wood Stork

If creek swamps and cypress domes are mined, there will be some loss of existing habitat. The negative impacts of this loss would be compensated for by mining and reclamation practices (included in the stipulations) that would create conditions favorable for the species.

Gopher Tortoise

Based on studies of other surface mining areas, a permanent loss of gopher tortoises and gopher tortoise habitat in these areas is likely.

Short-Tailed Snake

Short-term unavoidable adverse impacts would be the loss of habitat and individuals from mined areas. There is insufficient information to determine if the species can recolonize mined areas, and long-term impacts cannot be evaluated.

Florida Gopher Frog

No unavoidable adverse impacts.

3. Forage (No change)

4. Timber (Replaces first paragraph of original section, and paragraphs "a"and "b" pg. V-2)

The acreage and timber volume loss estimated below is calculated on the worst-case analysis appearing in Chapter III. This assumes that commercial sawtimber production cannot be reestablished. If it can, the net effect of mining on commercial sawtimber production will vary with the success of reclamation efforts. That success cannot be projected based on present knowledge. Readers should reference the discussion in Chapter I, "Reclamation on the Osceola National Forest" The estimates can be summarized as follows:

a. A 28,000 acre reduction in timber producing land, because of the creation of 9,000 acres of lakes and 19,000 acres of reclaimed lands of undetermined productivity.

b. A probable reduction in growth during the 30-year mining period, averaging about 4.5 million board/feet per year for a total loss of 135 million board feet. By the completion of mining, and each year thereafter, there would be an annual growth loss of 9.1 million board/feet. This is approximately one-fifth of the net annual growth for the entire Forest.

Paragraphs c, d, e and f remain as is.

5. Recreation (No change)

6. Land Uses and Improvements (No change)

C. AESTHETICS (No Change)

D. HISTORICAL AND ARCHAEOLOGICAL VALUES (No Change)

CHAPTER 6

SHORT-TERM USES VERSUS LONG-TERM PRODUCTIVITY OF THE AREA

A. SOIL (No change)

B. WATER RESOURCES (Replaces original section, pg. VI-1)

The short-term effects of mining would include an increase in the concentration of dissolved solids, sulfate, floride, phosphorus, nitrogen and Radium 226 in surface water receiving mine discharges (see Chapter VIII, Table 14, which identifies similar effects of mining on water quality). This change in water quality would decrease the aesthetic appeal of Forest and adjacent streams. Accelerated erosion and sedimentation could cause a degradation of fishing. No data are available to determine the social benefits or costs of these effects. The possible increase in Forest water yield during mining is estimated at 20,700 acre-feet/year. Flows at the conclusion of mining could be reduced from pre-mining measurements by 4,500 acre-feet/year (2%) due to evaporation from ponds and lakes. (The method of computation for this estimate is the same as in GS WRI 78-6)

The stream that receives mine discharge (presumably Robinson Branch) would have its normal low flow regime altered. The alteration would probably increase the quantity of water flowing during most low flow periods. However, an operating mine could withhold discharges during a drought, which would decrease water flows and increase the number of days of low flow in the receiving system.

Flood flows might increase or decrease, depending upon the design and placement of stream diversions and structures and the routing of flows.

Newly created water bodies might require extensive and costly maintenance to control undesirable plants and insects.

Pumping of approximately 17.28 million gallons per day would drawdown the potentiometric surface of the Floridan aquifer less than 5 feet at Taylor, Lake City and White Springs. (The value 17.28 million gallons per day was used to establish a conservative (greatest) estimate of drawdown (pg. 139, GS WRI 78-6). The estimated rate is 14.6 million gallons per day for this proposal.) After mining, the level of the aquifer would return to normal.

C. CLIMATE AND AIR QUALITY (No change)

D. VEGETATION AND FORAGE (No change)

E. WILDLIFE AND FISHERIES (No change)

F. TIMBER (No change)

G. RECREATION (No change)

H. AESTHETICS (No change)

I. LAND USES (No change)

CHAPTER 7

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

A. DEPLETION OF MINERAL RESOURCES (Replace the first paragraph of the original section, pg. VIII-1, with the following)

Approximately 108 million metric tons of phosphate and 3,890 metric tons of uranium (U_3O_8) would be removed from the Osceola National Forest.[1]

Replace the accompanying footnote [1] with the following:

[1] 100 percent recovery (108 million metric tons x .004% would yeild 4,320 metric tons of U_3O_8. Actual recovery, however, would be about 90 percent or approximately 3,890 metric tons of U_3O_8.

B. LANDFORM CHANGES (No change)

C. COMMITMENT OF WATER RESOURCES (Replaces original section, pg. VII-1)

During mine operation, 31,000 acre-feet/year of water would be affected in chemical makeup and subsequently discharged to receiving waters. Mining and beneficiation would require 10,144 gallons/minute (16,361 acre-feet/year) of water from the Floridan aquifer.

At the conclusion of mining, the Forest would yield 4,500 acre-feet/year (2%) less water, because approximately 9,000 acres of the mined area will remain as open water, evaporating nearly 46 inches of water per year.

Over approximately one-third of the mined area, stream-associated ecosystems would be converted to lake-associated ecosystems, with the accompanying changes in water quality, fisheries and aesthetics.

D. SOILS (No change)

E. VEGETATION (Replaces entire section, pg. VII-1)

If the area were mined, vegetative communities might eventually return over long periods of time, but most would not resemble their present state for several hundred years, if ever. For example, Clewell (1971), speaking of the Apalachicola National Forest, believes that wiregrass has such a low reproductive capacity that, once removed from an area, it will never return. Other major understory components such as palmetto, shiny blueberry, and runner oak are often greatly reduced by surface discing for reforestation. Mining might eliminate these species permanently from the communities where they are now found.

The pine flatwoods community consists of four natural phases, brought about by slight differences in soils, water tables, and organic hardpans. The establishment of these conditions took place over geologic rather than historic periods of time. It has not been demonstrated that these four habitat phases can be artificially reproduced.

Nearly all the remaining large tracts of pine flatwoods forest in northern Florida and southern Georgia are in private ownership and are managed on short rotations (less than 30 years) for pine pulpwood production. The Osceola, in contrast, is one of only a few remaining large tracts that are managed for sawtimber on long (60-year) rotation. With sawtimber rotations, which provide an age class distribution of 0-60 years for pine and 0-100 years for hardwoods, both vegetation and associated wildlife communities are considerably more diverse than those associated with pulpwood rotations. Mining the potential phosphate deposits would cause a further reduction in the already limited supply of these more diverse habitats.

The state-of-the-art in current reclamation practices consists of re-leveling the ground and fertilizing and seeding the area with millet, Bahia grass, ryegrass, etc. Slash pine probably can be reestablished on these areas, although even this assumption has not been proven at this time.

F. FISH AND WILDLIFE HABITAT (Replaces original section, pp. VII-1-VII-2)

If mined areas can be restored to their current vegetative or aquatic composition, many species of wildlife and fish would probably reestablish themselves in the area. In this case, the initial reduction in populations would not constitute a totally irretrievable loss. It should be recognized however, that with the creation of water areas on what is now land, most aquatic species would gain additional habitat at the expense of terrestrial species.

In the case of habitat for certain threatened or endangered species, mining might indeed result in an irretrievable loss. The exact habitat requirements of many threatened or endangered species are not completely understood. Therefore, even if apparently suitable vegetative types were restored after mining, they might not, in fact, fulfill the precise habitat requirements of the species. For example, there is no indication that the gopher tortoise is able to recolonize mined areas, even though the habitat appears to be suitable.

G. TIMBER (Replaces original section, pg. VII-2)

The acreage and timber volume loss estimated below is calculated on the worst-case analysis appearing in Chapter III. This assumes that commercial sawtimber production cannot be reestablished. If it can, the net effect of mining on commercial sawtimber production will vary with the success of reclamation efforts. That success cannot be projected based on present knowledge. Readers should reference the discussion in Chapter I, "Reclamation on the Osceola National Forest".

Growth loss on mined lands during the 30-year mining period will average 4,500,000 bd. ft./yr., or a total of 135,000,000 bd. ft.

An estimated 9,000 acres of water areas would be permanently lost to production of timber. The remaining 19,000 acres of mined areas would be lost to timber production. The total annual growth loss on the 28,000 acres following mining is estimated to be 9,100,000 bd. ft.

H. AESTHETICS (No change)

I. HISTORICAL AND ARCHAEOLOGICAL VALUES (No change)

CHAPTER 8

ALTERNATIVES

A. DELAY ACTION

1. No Action (Delete the paragraph beginning "Neither the Mineral Leasing Act nor . . .,"pg. VIII-1, and replace with the following)

Regulations issued on May 7, 1976 (43 CFR 3520.1-1(c) and 3521.1) have defined the phrase "valuable mineral deposit"and specify the manner in which the Secretary shall reach his conclusion. According to the regulations, a permittee has discovered a valuable deposit if the mineral deposit discovered under the permit is of such a character and quantity that a prudent person would be justified in the further expenditure of his labor and means with a reasonable prospect of success in developing a valuable mine. To permit the Secretary to make this determination, the permittee must submit, under 43 CFR 3521.1, sufficient evidence to show that there is a reasonable expectation that his revenues from the sale of the mineral will exceed his costs of developing the mine, extracting, removing and marketing the mineral, and complying with existing governmental regulations, reclamation and environmental standards, and proposed lease terms. (See Chapter XII, Appendix 2.)

2. Delay Decision on Leasing (In the paragraph beginning "This alternative involves the delay . . .,"pg. VIII-1, delete the first sentence and replace with the following)

This alternative involves the delay of a decision on issuance of leases until new mining and reclamation plans and methods have been set forth by the mining companies applying for preference right leases.

In the paragraph beginning "Mining applicants may desire . . .,"delete the first sentence and replace with the following: Mining applicants may desire to include new or previously unapplied technologies in their lease applications.

B. ISSUANCE OF LEASES

1. Issuance of All Leases Where Preference Rights Have Been Earned (Add the following)

Implementation of this alternative would not satisfy the recommendations of the Biological Opinion, and, therefore, would not be consistent with conservation of listed species on the Osceola National Forest.

2. Selective Leasing to Protect Sensitive Areas (Delete the last paragraph of this section, beginning "Implementation of this alternative. . .,"pg. VIII-1, and replace with the following)

Implementation of this alternative would require special legislation to give the Secretary of the Interior discretionary authority to disapprove lease application for environmental reasons. This legislation could provide for compensation to the lease applicants. However, under recent court decisions, the same effect could be achieved without legislation by imposing conditions to exclude mining in these sensitive areas.

3. Leasing with Delayed Authorization to Mine (No change)

4. Purchase of Comparable Lands (No change)

5. Issuance of leases providing for two beneficiation plants on the Forest (adds new alternative)

a. Description of Alternative

(1) Introduction

This alternative considers the construction of two beneficiation plants on the Osceola, as proposed in a hypothetical mining plan prepared by Allen T. Cole, to reduce mining, processing and waste disposal costs; and to facilitate reclamation. (Cole, Allen T., 1977, Water demands of two logical phosphate mining units, Osceola National Forest: Unpub. rept. prepared for U.S. Bureau of Mines, Washington, D.C., 33 pgs.)

This plan identifies two logical mining units, based on the distribution of the four lease application areas (see Fig. 23). Each unit will be designed to produce approxi-

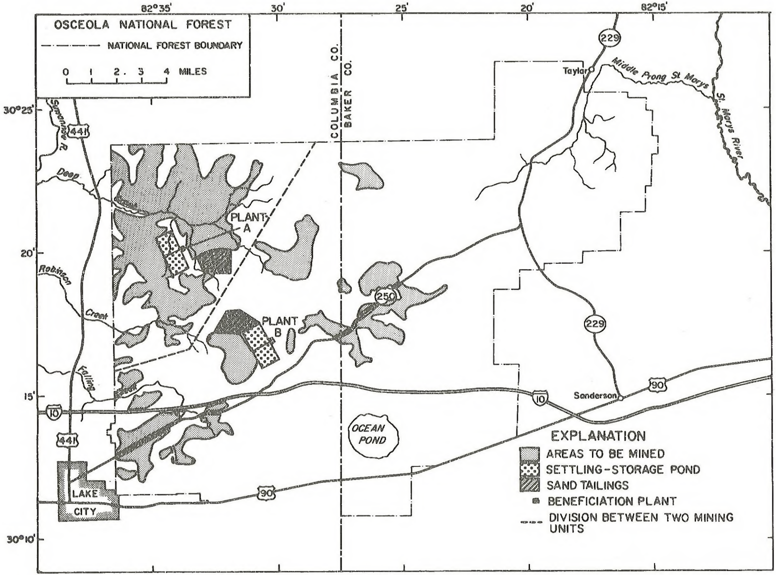


Figure 23. Layout of Two Potential Mining Units in Osceola National Forest (After Cole, 1977)

From GS WRI 78-6, pg. 125.

mately 1,800,000 metric tons (2,000,000 short tons) of phosphate rock annually. The Cole mining plan was used by the Geological Survey in preparing GS WRI 78-6, and by the Fish and Wildlife Service in FWS Report (Mar. 78).

(2) Assumptions

Assumptions in this alternative, as outlined in Table 10, differ from the proposed action in Int. FES 74-37 in the following major ways:

—Beneficiation plants and associated storage of sand tailings and slimes would be on the National Forest rather than on private land.

—Permanent water areas would be reduced by approximately 50% (4,400 acres).

—Initial sand and slime storage on the National Forest would be 32-42 ft. above ground on 2,760 acres of land not planned for mining. These initial slimes and sand tailings would eventually be reclaimed, probably at the above-ground storage site. Subsequent sand tailings and slimes would be used in combination with overburden to backfill mined cuts on reclaimed areas not converted to lakes.

—Permanent access roads and a railroad spur would be required.

Table 11 describes the land and water requirements used to compute the hydrologic effect of the alternative.

(3) Mining Methods

Except for the updated equipment requirements and revision of figures for the annual acreage to be mined by the two operations (as proposed by Cole), the description of the mining process in the alternative is the same as found in Chapter I, Sec. E.3., Int. FES 74-37. Based on available prospecting estimates, approximately 1,060 acres in the two sectors would be mined each year by the four 45-cubic-yard draglines, producing 3,600,000 metric tons (4,000,000 short tons) of recoverable rock.

Production development would require that mine roads, powerlines, and a railroad spur be constructed within the Forest area. The plant road and electrical powerline would follow the path of the railroad spur. The total right-of-way width required would be 160 to 200 ft. (based on personal communication, Clyde Watkins, Mines Planning Supervisor, Brewster Phosphate Co., 8/16/78). Immediately prior to mining, the dragline path would also be cleared and graded by bulldozers to provide a level operating area for the walking draglines. Pipelines, slurry systems, and hydraulic pipe with associated pumps would be constructed and moved as necessary to connect the draglines to the central washer area.

Two 820-acre settling storage ponds will be constructed above ground to store the 150-mesh clayey waste or slimes over the first three years of mining. Following this initial period, the subsequent slimes would be used to backfill mined cuts. Sand tailings would be temporarily stockpiled on 1,120 acres.

Once reclamation is begun, the subsequent tailings would also be used in backfilling the mined cuts. How long the tailings are disposed of above ground would depend on the type of fill selected. For example, if a sand-clay mix fill were chosen (see Appendix 9), the tailings could be used for backfill within three years. If, on the other hand, a clay fill capped with a sand layer were used, the sand tailings would be disposed of above ground for the first five years of mining, prior to being used for backfill. The above-ground settling storage areas for the initial slimes could eventually be revegetated.

With the exception of mobile equipment, one can assume that all mine equipment would be operated on electricity. A power company in the Lake City area would probably provide electricity to the mine and plant sites. Due to the size of the draglines and length of the pumping system necessary for ore transport, the power required by mining equipment on the Forest can be estimated to be nearly double what would usually be expected for the projected production level.

Approximately 94% of the total water requirements would be met by recirculation. Losses within the system would be due primarily to evaporation and the absorption of water by the clays left in the settling ponds.

(4) Process Descriptions

The beneficiation plants and associated structures for the two hypothetical mining operations would occupy about 200 acres. The washing and flotation process would be the same as that described in Chapter I, Sec. E.5.a. of this supplement. The rock drying and rock grinding processes would be the same as those described on pg. I-24 of Int. FES 74-37.

(5) Reclamation

Locating the beneficiation plants on the Forest will allow sand-clay mix fill to be used for the disposal of slimes and sand tailings, thereby increasing the reclaimed land area. Techniques for reestablishment of the biological communities will be commensurate with those applicable to the proposed action.

b. Environmental Impacts

Impacts on environmental components are much the same as for the proposed action. Refer to Chapter III discussion regarding these impacts. A summary or discussion of impacts to selected components follows.

(1) Geology

Slimes will be stored above ground, resulting in an increase in surface radiation levels.

(2) Water Resources

Streamflow characteristics

Mining would disrupt normal flows of Deep Creek, Robinson Creek, Falling Creek, and Middle Prong St. Marys. The anticipated distribution of mining among the four basins in the Forest is indicated in Table 12.

It is estimated that, during mining, average annual flows of Falling Creek, Robinson Creek and Middle Prong St. Marys would decrease by 7.1, 6.4 and 2.5%, respectively. These decreases are relatively minor, amounting to 1,700, 1,350 and 1,750 acre-feet/year, respectively. After conclusion of the proposed mining, estimated annual flows would be reduced by 1.4, 0.6 and 0.5% for Falling Creek, Robinson Creek and Middle Prong St. Marys, respectively. These decreased flows are estimated to be caused by evaporation from 2,300 acres of lake surface (annual evaporation loss of 46 inches/year) distributed among the three basins which were formerly forested (annual evapotranspiration loss of 40 inches/year).

TABLE 10--Comparison of New Alternative with Proposed Action

	This Alternative 1/	Int. FES 74-37 Proposed Action
Location of beneficiation plants	Two plants on Forest	On private land (T. 2 S., R. 17 E., Sec. 21)
Area to be mined (acres)	26,500	28,000
Quantity of phosphate rock (million tons)	100 (short tons) 91 (metric tons)	120 (short tons) 109 (metric tons)
Time (years)	28 (Plant A) 22 (Plant B)	30
Acres mined/year	1,060	750-1,000
Million tons of product/year	4.0 (short tons) 3.6 (metric tons)	4.0 (short tons) 3.6 (metric tons)
Total water use (million gallons/day)	227	227
Replacement water (million gallons/day)	14.6	14.6
Water area left (acres)	4,600 2/	9,000
Roads	One major access road	No new major roads
Railroad	Spur to plant	None on National Forest
Slime and sand disposal	2,760 acres initial 33-42' above ground. The remainder would be deposited in mined-out pits. 3/	10,000 to 12,000 acres on private land 20' above ground level.
Area to be mined by watersheds	Approximately same as proposed action.	See Table 8, Chap. III of this Supplement.

1/ Cole, Allen T., 1977, Water demands of two logical phosphate mining units, Osceola National Forest: Unpub. rept. prepared for U.S. Bureau of Mines, Washington, D.C., 33 pgs.

2/ Subject to change depending on reclamation plan.

3/ Area of mined-out pits is calculated to be 21,900 acres by subtracting 4,600 acres of water from 26,500 acres to be mined.

TABLE 11--Land and Water Use Requirements of the Two Hypothetical Mining Operations Proposed by Cole[1]

Land Use	Acres	Acre-Feet
Sand-tailings pond	1,120	36,960
Phospatic clayey waste settling pond	1,640	68,880
Average open water during mining	530	2/

Water Inputs	Acre-Feet/Year
54 inches of rainfall on 3,290 acres of open water (1,120 + 1,640 + 530)	14,804
Seepage water from mine pit walls	5,162
Water in ore	8,594
Water from deep wells	16,361
TOTAL INPUT	44,921

Water Outputs	Acre-Feet/Year
46 inches of evaporation from 3,290 acres of open water	12,612
Water in final product	1,168
TOTAL OUTPUT	13,780

Water that must be discharged	
(Inputs minus outputs)	31,141 acre-feet/year
(Rounded value)	31,000 acre-feet/year

1/ Cole, Allen T., 1977, Water demands of two logical phosphate mining units, Osceola National Forest: Unpub. rept. prepared for U.S. Bureau of Mines, Washington, D.C., 33 pgs. See also GS WRI 78-6, pp. 124-127.

2/ Open water is the result of mining the pit and maintaining the hydraulic system.

TABLE 12--Anticipated Distribution of Mining Among the Four Basins in the Osceola National Forest

	Basin Size at Gaging Station in Square Miles	Percent of Basin to be mined
Deep Creek	88.6*	28
Falling Creek	24.6	25
Robinson Creek	20.8	16
Middle Prong St. Marys	120.9	6

*Deep Creek Basin extends beyond the northern boundary of the Forest.

During mining, waters that formerly flowed in other streams would be used in the mining process and discharged into Deep Creek. The net difference between the before-mining and during-mining water budget for the Forest would be an increase of 20,683 acre-feet/year, representing the decrease in water flow of Robinson Creek, Falling Creek and Middle Prong St. Marys (-4,887 acre-feet/year) plus the increased flow of Deep Creek (25,656 acre-feet/year), which would have 28% of its basin disturbed by mining. (Deep Creek "natural"flow during mining would be decreased due to change in basin size (-3,692 acre-feet/year) and pit and ore-water extraction (-1,738 acre-feet/year). This "natural"flow decrease is masked by diverting all discharges to Deep Creek (64,144 -3,692 -1,738 31,000 = 89,714 acre-feet/year). Slightly greater than half the increased flow in Deep Creek would be from ground water withdrawn from the Floridan aquifer.

At the conclusion of mining, water flows would be decreased due to the evaporation over 4,600 acres of standing water. The water loss is estimated to be nearly six inches per year, but could be more or less (GS WRI 78-6, pp. 17 and 99). The decreased water yield after mining is estimated to be 2,258 acre-feet/year (1.3% of natural water yields).

The water budget before, during and after mining with all discharges made to Deep Creek would be as indicated in Table 13.

It can be assumed that normal mining and beneficiation would totally disrupt original stream channels. Flood peaks would either be increased or decreased, depending on the design and construction of earthworks, the beneficiation plant's hydraulic system, dams, roads, railroads, lakes, slime ponds and retaining dikes. It is impossible to predict with any reliability where or when a flood might occur as a result of extreme rainfall events or failure of an earthwork. The historical record of slime pond failures and dam breaks in central Florida phosphate mines indicates that floods may result from such breaks, but the exact causes of the breaks are not usually known or documented unless they are publicized or become an enforcement action (personal communication, Florida Department of Environmental Regulation).

Alteration of flood flows in Middle Prong St Marys would be slight due to the small area of disturbance in the basin.

Low flows of Deep Creek could be increased by discharges from the hypothetical mine, even during extreme low rainfall periods (1908 was the record low year at Lake City—29.83 inches total rainfall). The proposed mine (units A and B) would have the capacity to supplement normal rainfall inputs (33% of the total water requirements of the operation) by using two 3,000 gallon/minute deep well pumps developed in the Floridan aquifer and held as reserve units for the 4 production pumps normally in operation. Therefore, even in times of low flow the mine will have the capacity to maintain its estimated average discharge of 42.8 cfs into Deep Creek. Low flows of less than 1 cfs in Deep Creek were recorded in April, May, October and November of 1976.

A continual mine discharge into Deep Creek could change the low flow distribution of the Suwannee River at White Springs. An annual minimum 30-day average flow would not go below 42.8 cfs, if mine discharges were held at the average estimated volume. As the severity of the low flow event increases (i.e., the recurrence interval increases), the proportion of total flow from Deep Creek to the Suwannee River would increase. For example, an unaltered 10-year annual minimum 30-day flow at White Springs on the Suwannee is estimated to be near 14 cfs (GS WRI 78-6, pg. 24). Considering that unit area contribution to flow is assumed to be uniform for the 2,430 square mile watershed above White Springs, an altered Deep Creek could raise the 10-year annual minimum 30-day flow to 56 cfs, and make up 76% of the total flow.

Surface-Water Quality

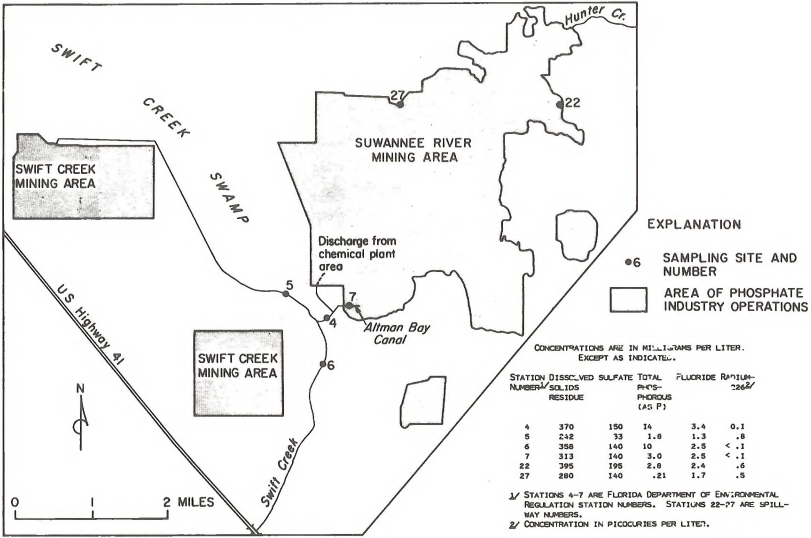
The quality of surface waters draining the proposed lease area would be changed during and after mining. Without a full account of the progression of a mining operation, the changes in surface-water quality are difficult to estimate, but some generalities can be drawn.

> "In areas being mined or reclaimed, the most noticeable changes in stream quality would result from draining and clearing of swampland and forest. Erosion and aeration or oxidation of both organic and inorganic materials would occur, producing an increase in suspended sediment and a decrease in the concentration of organic constituents relative to inorganic constituents in runoff from those areas. Additional changes could occur if leachate plumes formed and migrated to a stream. Since the hypothetical mining plan included no chemical plant in the National Forest, such a plume would be associated only with phosphatic clayey waste settling ponds and not with gypsum or cooling ponds" (GS WRI 78-6, pg. 133)

Considering that Deep Creek would receive water from mined-out areas and on-forest beneficiation, estimates of potential changes in water quality are not as difficult for Deep Creek as they are for other streams draining the Forest. Miller, et al (GS WRI 78-6) have used a simple dilution equation and averaged values of six observations of selected water quality parameters (Table 22, pg. 135, GS WRI 78-6) to estimate the average chemical makeup of Deep Creek during mining and beneficiation. (The dilution equation is q_1c_1 $q_2c_2 = q_3c_3$, where q_1 = natural stream flow, cfs; q_2 = discharge from mine; q_3 = combined flow; c_1 = natural concentration of a water quality parameter; c_2 = concentration of a substance discharged from the mine; and c_3 = combined concentration.) Data from a phosphate mine (the Occidental facility, approximately 10 miles northwest of the Forest in Hamilton County) were collected and determined to be representative of discharges from normal, state-regulated mining and beneficiation (stations 7, 22 and 27 in Fig. 24). Data from areas affected by chemical plant runoff or discharges were not used in developing any estimates. By using average flow values previously described. estimates of the average quality of Deep Creek waters can be made (Table 14). These estimates compare favorably with recorded data from Hunter Creek, a 25.4 square mile tributary to the Suwannee that has the southern half of its basin disturbed by the Occi-

TABLE 13--Water Budget Before, During, and After Mining

	Estimated annual flow, acre-ft./year		
	Before Mining	During Mining	After Mining
Deep Creek	64,144	89,714	62,789
Robinson Creek	21,082	19,727	20,905
Falling Creek	24,934	23,152	24,595
Middle Prong St. Marys	70,022	68,272	69,635
TOTAL YIELD	180,182	200,865	177,924



CONCENTRATIONS ARE IN MILLIGRAMS PER LITER. EXCEPT AS INDICATED.

STATION NUMBER[1]	DISSOLVED SOLIDS RESIDUE	SULFATE	TOTAL PHOS-PHOROUS (AS P)	FLUORIDE	RADIUM-226[2]
4	370	150	14	3.4	0.1
5	242	33	1.8	1.3	.8
6	358	140	10	2.5	< .1
7	313	140	3.0	2.5	< .1
22	395	195	2.8	2.4	.6
27	280	140	.21	1.7	.5

[1] STATIONS 4-7 ARE FLORIDA DEPARTMENT OF ENVIRONMENTAL REGULATION STATION NUMBERS. STATIONS 22-27 ARE SPILLWAY NUMBERS.

[2] CONCENTRATION IN PICOCURIES PER LITER.

Figure 24. Locations of Sampling Sites and Selected Analyses of Samples Collected October 18 and 19, 1976, at Phosphate Industry Operations in Hamilton County, Florida

From GS WRI 78-6, pg. 119.

TABLE 14--Estimates of Average Concentration of Selected Water Quality Parameters on Deep Creek with Natural Flow and Flow Altered by Mining and Beneficiation Adjacent to the Western Edge of the Osceola National Forest[1]/

	Deep Creek-Natural (mg/L)	Deep Creek-Altered (mg/L)
Dissolved Solids (Sum)	36	123
Dissolved Solids Residue	100	179
Sulfate	7.8	56
Fluoride	0.1	0.9
Total Phosphorus (as P)	0.10	0.71
Total Nitrogen (as N)	0.81	2.9
Radium 226	0.06[2]/	0.14

1/ Computations based on data from GS WRI 78-6, pg. 135, and flow volumes described on pg. 134.

2/ Median concentration in picocuries/per liter.

TABLE 15--Comparison of Average Concentration of Selected Water Quality Parameters from Deep Creek and Hunter Creek for 12 Observations from April 1976 through March 1977 1/

	Deep Creek-Natural (mg/L)		Hunter Creek 2/ (mg/L)	
Total suspended sediment	3	(66)	11	(73)
Dissolved solids (Sum)	36	(28) 3/	129	(74)
Dissolved solids residue	100	(15)	171	(55)
Sulfate	7.8	(37)	53.4	(117)
Fluoride	0.1	(50)	1.3	(48)
Total Phosphorus (as P)	0.10	(50)	1.10	(84)
Total Nitrogen (as N)	0.81	(19)	2.46	(89) 4/
Specific Conductance (micoromhos/cm at 25 C)	57	(25)	207	(69)
Temperature C	17	(39)	17	(39)
Calcium (Ca)	4.1	(59)	21.5	(77)
Magnesium (mg)	1.2	(57)	8	(60)
Sodium (Na)	0.4	(10)	9.8	(52)
Potassium (K)	0.1	(50)	0.8	(52)
Bicarbonate (HCO_3)	9	(144)	38	(62)
Radium 226	0.06 5/		0.11	

1/ Tests were made within 1 day of each other on a near monthly sample schedule - data from the GS District Office, Tallahassee, Florida.

2/ GS Station 02315005 in Hamilton County - the southern half of the basin is disturbed by phosphate mining and beneficiation regulated by the State of Florida.

3/ Value in parentheses are coefficient of variation computations from available data.

4/ Only 10 observations were available.

5/ Concentration are median values in picocuries/L from 5 and 8 observations on Deep and Hunter Creeks, respectively.

dental mine and beneficiation operation (Tables 14 and 15). Data from the Hunter Creek Station were obtained from the GS District Office in Tallahassee, Florida. It must be noted that the values presented in Table 14 are only estimates of average conditions. Low natural flows with high discharge volumes would result in different concentrations, as would higher natural flows with lower mine discharges.

Review of Table 15 indicates that, for the 12 dates that samples were collected between April 1976 and March 1977, the Hunter Creek data have a higher coefficient of variation (a measure of the variability of a set of numbers) for 11 of the 14 parameters listed in the table. This observation indicates that the water quality of the stream draining the mined area is more variable than that of a natural stream. This may or may not be significant to the aquatic habitat. Also, note that mean concentration of each parameter in Table 15 (except for temperature) is greater for Hunter Creek than for Deep Creek. As in the case of the more variable stream quality, the biological significance of elevated concentrations of various constituents is not known.

Ground Water Flow

The surficial aquifer flow patterns would be disrupted by dewatering during mining. The water level adjacent to any open pit would be lowered. The effect, however, would be local. The following text from GS WRI 78-6, pp. 137-138, describes the effects of mining on the surficial aquifer.

> "Topography of the currently mostly flat and featureless National Forest surface would be modified by the mining activities. Locally, post-mining relief might be increased by as much as a few tens of feet if mining were to be done as it is being done now (1977) in Hamilton County. Because the configuration of the water table is generally a subdued replica of the topography of an area, the post-mining water table locally would have greater relief. The magnitude of the change in configuration from that of the nearly flat and relief-free water table existing today would depend largely on the amount of change in relief of the land surface. At present, the water table is at or within a few feet of the land surface throughout much of the Forest. After mining, depth to the water table might be increased to perhaps 10 to 20 feet below land surface beneath areas of mounds or ridges left by the mining processes. In those areas where excavation and backfill operations leave the land surface depressed from what it is today, the depth to the water table would probably decrease from what it is now, at least during part of the year.
>
> "The resulting relief of the water table would depend, at least in part, on the permeability of redeposited material. Where permeability of the mounded materials was low, the water table would stand at higher elevations than where permeability was greater.
>
> "The modified water table would tend to fluctuate in response to climatic conditions over a wider range than it had before disturbance. The magnitude of water-table fluctuations would be greatest beneath the mounds and ridges and least in the depressions. It is difficult to quantify the range of fluctuations without knowledge of the new permeability distribution that would result within the surficial aquifer from the mining operations. However, the seasonal range in the new mound and ridge areas might be two or more times the few feet of fluctuation that occurs today throughout most of the comparatively flat Forest"

The potentiometric surface of the Floridan aquifer would be lowered by the pumping of makeup waters. Estimates made in GS WRI 78-6 indicate that the drawdown of the potentiometric surface after 30 years of the assumed pumpage would be less than 5 ft. at Lake City, White Springs, and Taylor. The estimates assume a non-leaky model aquifer bounded by sources of recharge that include the Suwannee River, Falling Creek and the karst area to the southwest of the Forest (GS WRI 78-6, pg. 145). Drawdowns beneath the proposed pumping centers (sites A and B) are estimated at 35 ft. for the above model, with a drawdown of 11 ft. midway between pumping centers. One can assume that a similar drawdown would develop if pumps were located beyond the western edge of the Forest. No computations have been made for hypothetical well nests at any location other than the two identified by Cole and referenced in GS WRI 78-6.

The potentiometric surface of the Floridan aquifer would return to pre-mining elevations if other ground water withdrawals were not developed during the mining and continued afterwards.

Ground Water Quality

The quality of the water in the surficial aquifer could be affected by mining activities. Excavation and backfilling would change the pre-mining geochemical equilibrium, i.e., increase or decrease concentrations of naturally occurring chemical constituents. Most effects would be local, as large scale or continual water recharge of the surficial aquifer is not a customary mining practice. If leachate materials (chemical constituents moving within ground water) were to develop under and/or adjacent to a slime pond, any slimes which were not contained by the hydraulic system would migrate to a stream or move downward to an underlying strata (GS WRI 78-6, pg. 147).

The chemical quality of the underlying Floridan aquifer could be changed during pumping due to any of the following: the upward migration of underlying, more mineralized ground waters; leakage of chemical constituents from the surficial aquifer; sudden collapse of a sinkhole; or accidental or intentional mine discharges to Falling Creek, a direct recharge source to the Floridan aquifer. Without definitive mining plans and detailed site investigations, estimates of possible changes in the chemical makeup of water in the Floridan aquifer can be no more than guesses. (Pages 148-150 of GS WRI 78-6 offer a good discussion of the potential causes of ground water quality changes in the Floridan aquifer.)

(3)Soils & Vegetation

Over the majority of the mined area, 26,500 acres, the natural soils and plant associations would be completely altered. The soils would be replaced with overburden of variable quality and tailing sands, and the natural vegetation would be superceded by pasture consisting chiefly of Bahia and Bermuda grass.

If the reclaimed land were not managed to maintain pasture conditions, woody species would eventually invade. The land surface would be several feet above the original land surface, suggesting that a drier condition would be characteristic. However, the interaction of surface topography and buried slimes, which would probably tend to perch water above the slimes, might result in a random interspersion of dry and boggy areas. This would be particularly likely if a well defined surface drainage pattern is not designed into the land surface, or if subsidence occurs over the slimes. The plant communities that would eventually replace the pasture grasses are unknown. Woody communities that reflect the hydrologic conditions would eventually develop. The development of many small bogs (wet areas with no well-defined drainage) interspersed among zeric (sand) and mesic (clays) uplands seems possible.

(4) Wildlife and Fisheries

On-forest beneficiation and associated activity is expected to produce adverse short-term and potential beneficial long-term impacts over those associated with the proposal.

The adverse impacts would be associated with the removal of additional habitat over an extraction and slurry operation. Plant operations would involve additional machinery noise and an increase in human activity in and around the sites. Traffic on access roads would also be increased due to the increase in workers and plant material suppliers. Construction and use of the railroad spur, even if located within an existing facility corridor, would further discourage wildlife movement in and through the corridor. Forest fish and wildlife habitats could be more immediately threatened by a clayey waste area spill if these impoundments were located on the Forest.

The potential beneficial impacts would accrue from the capacity to return the slimes and sand tailings to the mined areas, thereby reducing the acreages of open water contemplated in the FES.

(5) Timber

The 9,000 acre reduction in land area due to the creation of lakes would be cut to 4,600 acres.

c. Mitigating Measures

(1) Geology

As part of the reclamation process, the clay slimes and sand tailings would be placed at the bottom of the mined-out areas—their natural zone of occurrence. The placement of the overburden on top of the slimes and sand tailings would reduce radiation from these beneficiated materials. The net result of this reclamation process might elevate the radiation above ambient levels, but this increase would not be significant.

(2) Water Resources

The mitigating measures required by this alternative are the same as those outlined in Chapter IV of this supplement, with the exception that:

(a) All mitigating measures will also be applied to benefication operations; and

(b) All mitigating measures will also be applied to slime ponds, sand tailings, and other related facilities.

(c) Sites for clayey waste settling areas and water storage will be located away from drainage systems, in order to reduce the amount of material entering the water in the event of an accidental spill.

(3) Wildlife, Fisheries, and Timber

It may be possible to reduce even further the 4,600 acres of open water contemplated in the Cole Report by manipulation of the slimes, sand tailings, and overburden. If this is the case, additional land surface could be made available for terrestrial wildlife species and timber production.

Stipulations

All of the stipulations in Chapter IV of this supplement will apply, with the addition of the following:

Radioactive Pollution

Clay slimes and sand tailings will be returned to the mined areas and utilized in reclamation activities. The clay slimes and sand tailings will be incorporated into a mixture and placed in the bottom of the mine-out areas and covered with overburden.

d. Adverse Effects that Cannot be Avoided

Same as described in Chapter V of this supplement, with these additions:

(1) Wildlife & Fisheries

Increases in habitat removed and human disturbance due to beneficiation on the Forest are adverse effects on wildlife which cannot be avoided.

(2) Timber

The 9,000 acre reduction in timber-producing land due to the creation of lakes is cut to 4,600 acres.

e. Short-Term Verses Long-Term Productivity of the Area

Same as described in Chapter V of this supplement.

f. Irreversible and Irretrievable Commitment of Resources

Same as described in Chapter V of this supplement.

C. DENY ISSUANCE OF LEASES (Delete the first paragraph of this section, pg. VIII-2, and replace with the following)

In accordance with a recent court decision, the Secretary of the Interior cannot deny lease applications if the permittees have discovered a "valuable deposit" The Osceola lease applications are based on prospecting permits approved by the Forest Service under delegation of authority from the Secretary of Agriculture. Approval of the prospecting permits also constitutes consent of the Secretary of Agriculture to leasing unless a specific condition is included in the prospecting permit to provide otherwise. (Whether the Secretary of Agriculture does, in fact, give consent to leasing by agreeing to a prospecting permit—as the relevant statutes at 30 U.S.C. 211(b) and 30 U.S.C. 351, 352 indicate—has not been litigated.) Therefore, special legislation would be necessary to provide authority to deny issuance of the leases.

If the leases are not issued and the phosphate on the Osceola is not mined, alternate sources would have to be developed to make up the deficit. The environmental consequences of obtaining alternate sources cannot be assessed unless these sources can be identified and the environmental impacts of mining in those specific areas are evaluated.

1. Cash Payment (This section is now numbered. Otherwise no change.)

2. Mineral Exchange (This section is now numbered. Delete the original section, pg. VIII-2, and replace with the following)

Under regulations published on December 23, 1977 (43 CFR 3526), a mineral prospecting permittee may, upon the Secretary's determination that it is in the public interest, relinquish the lease to be acquired under preference right in exchange for mineral lease of other lands of comparable value for phosphate, sodium, potassium or sulphur or for the grant of a certificate of bidding rights and/or the grant of modifications to an existing coal lease which adds contiguous coal lands or deposits. The impacts would be similar to those of "Cash Payment"

D. ALTERNATE SOURCES OR REDUCTION OF THE USE OF PHOSPHATE (No change)

E. LANDS EXCHANGE (No change)

F. LEGISLATION (No change)

CHAPTER 9

CONSULTATION AND COORDINATION WITH OTHERS

A. CONSULTATION AND COORDINATION IN THE PREPARATION OF THE DRAFT SUPPLEMENT

The Draft Supplement was prepared by an interagency team under the leadership of the Bureau of Land Management, U.S. Department of the Interior. The other agencies participating were the U.S. Forest Service of the Department of Agriculture, and the Bureau of Mines, U.S. Fish and Wildlife Service, and U.S. Geological Survey, all of the Department of the Interior.

The document to be produced was not an entire environmental statement, but a supplement to the original environmental statement (FES 74-37), with particular emphasis on threatened and endangered species and on water resources. The team was designed accordingly:

Team Leader-BLM
Project Coordinator-USFS
Environmental and Technical Coordinator-USFS
Hydrologist-OSM
Hydrologist-USFS
Hydrologist-USGS
Wildlife Specialist (2)-USFS
Wildlife Specialist-USFWS
Mining Engineer-USGS
Reclamation Specialist-OSM
Commodities Specialist (Phosphate)-BOM
Writer-Editor-BLM

In gathering data for the supplement, team members developed and maintained contact with Federal and State agencies, mining companies, universities and individual experts. A list of these contacts is on file and available for public inspection at:

Eastern States Office
Bureau of Land Management
350 S. Pickett Street
Alexandria, Virginia 22304

B. COORDINATION DURING REVIEW OF THE DRAFT SUPPLEMENT

1. Distribution of Draft Supplement and Requests for Comments

The Draft Supplement (DES 79-17) was filed with EPA on April 5, 1979, and notification of its availability was published in the *Federal Register* on April 13. Approximately 250 copies of the Draft Supplement were distributed initially to Federal, State and county agencies; U.S. Senators and Representatives; preference right lease applicants; other phosphate companies; conservation and environmental groups; libraries; and interested individuals. During the review period an additional 100-150 copies were distributed upon request to other interested organizations and individuals. A cover letter requesting comments on the Draft Supplement accompanied each copy. A complete distribution list of agencies, organizations and individuals is on file and available for public inspection at the Eastern States Office, Bureau of Land Management, at the address indicated above.

On the same day that notification of the availability of the Draft Supplement appeared in the *Federal Register*, an official press release was issued nationwide by the Department of the Interior, announcing issuance of the Draft Supplement, the deadline for comments, and the date and location of a public meeting on the document. An additional press release to further publicize the public meeting was distributed to all media outlets in Florida on April 20. On May 4, notification appeared in the *Federal Register* that the deadline for comments had been extended two weeks, to June 12, 1979.

2. Written Comments Received

Approximately 35 written comments were received in connection with the public meeting and as a result of solicitation through *Federal Register* notices, news releases, and cover letters accompanying the Draft Supplement. All but one of the comments were submitted on behalf of government agencies, preference right lease applicants and other phosphate companies, and conservation and environmental groups. Written comments from agencies, companies, organizations and groups are reprinted under paragraph 7.

3. Public Meeting

A public meeting to receive questions and comments on the Draft Supplement was held in Lake City, Florida, on May 9, 1979. Lake City was chosen due to its proximity to the Osceola National Forest and its central location in north Florida, and because it had been the site of a public hearing on the Draft Environmental Impact Statement in January 1974.

The meeting was convened by BLM Eastern States Director Lowell Udy at 7:00 p.m., and was concluded at 9:00 p.m. Approximately 65 persons were in attendance, including 14 who gave oral testimony. Participants were invited to submit written statements as well as oral remarks; both were considered in the preparation of the Final Supplement. A complete transcript of the proceedings is available from the Eastern States Office, Bureau of Land Management, at the address indicated above.

4. Summary of Public Response

Comments and testimony were received from a diverse group of agencies, companies, and organizations. Federal agencies generally addressed their comments to the adequacy of the Draft Supplement. State and county agencies, as well as companies and organizations, tended to offer broader statements in support of or opposition to the issuance of phosphate preference right leases and the subsequent mining of government owned phosphate on the Osceola. All of these views, together with the reasons given in support of them, the Final Supplement, and other data, will be conveyed to the responsible officials for their use in making a decision on the lease applications.

All comments, written and oral, were analyzed by the team to determine what revisions might be necessary to strengthen and improve the Draft Supplement. Some comments tended to fall into broad categories or "issues,"that were beyond the charge of the team to resolve. These are summarized in paragraph 5. The team's responses to more specific issues are detailed in paragraph 6.

5. General "Issues"

Testimony and written comments received from the public were of similar nature to those received during comment on the original draft environmental statement in January and February, 1974. Public concern was both mixed and predictable, depending on individual areas of interest. Five major issues, however, surfaced during the public input process. These issues require legal interpretation, policy determination, and economic analysis through the preparation of a Secretarial Issue Document (SID).

Interior policy provides for the development of a Secretarial Issue Document (SID) for the use of the Secretary in matters where there are substantial policy questions involved. The SID addresses policy, political, economic, social, and environmental aspects of the decision facing the Secretary as well as alternate courses of action. Such a document (SID) will be prepared for use by the Secretary in the decision making process for this action.

Some aspects of the general issues are addressed more specifically in paragraph 6. Responses to the general issues are as follows:

Issue A:

Issuing leases to mine phosphate on the Osceola National Forest would violate the Organic Act of 1897 which established the National Forest System, the intent of the Weeks Act of 1911 which authorized acquisition of lands for National Forest purposes, and the management policies for the National Forests stated in the Multiple Use-Sustained Yield Act of 1960.

Issue Raised By:

—State of Florida
—Suwannee River Authority
—Suwannee River Coalition
—Florida Defenders of the Environment
—Florida Audubon Society
—North Central Florida Regional Planning Council

Response:

The Organic Act of 1897, the Weeks Act of 1911, and the Multiple Use-Sustained Yield Act of 1960 and other legislation govern management of the surface resources of the Osceola National Forest. The management of surface resources is the responsibility of the Forest Service, U.S. Department of Agriculture.

The management of mineral resources on the Osceola National Forest is governed by the mineral leasing laws, such as the Mineral Leasing Act of 1920 and the 1947 Mineral Leasing Act for Acquired Lands.

The U.S. Department of the Interior, through the Bureau of Land Management and the Geological Survey has primary responsibility for managing mineral resources.

The Multiple Use-Sustained Yield Act states that "Nothing herein shall be construed so as to affect the use or administration of the mineral resources of National Forest lands—" The 1947 Mineral Leasing Act for Acquired Land however, not only requires the consent of the land management agency to lease, but also requires that such leases be subject to conditions the surface management agency "may prescribe to insure the adequate utilization of the lands for the primary purposes for which they have been acquired or are being administered" The Mineral Leasing Act of 1920 also makes leasing subject to a determination that "the public interest will be best served thereby"

Forest Service policy is to consent to the issuance of mineral leases when the action is determined to be in the public interest. When consent is given, policy required that leases prohibit unnecessary disturbance of the surface and provide for restoration of the surface. It is the Forest Service's objective to apply the concept of multiple-use in its broadest sense by integrating the development of mineral resources with the use and conservation of other forest resources.

Issue B:

What are the radiation effects on plants, animals and humans?

Issue Raised By:

—Suwannee River Coalition
—Four Rivers Audubon Society

—Board of County Commissioners, Columbia County, Florida

Response:

The existing radiological environment of the Osceola National Forest is described in Chapter II, Sec. 2-d (pg. II-4), and indicates that radiation effects will be less than that found in central Florida since the matrix in north Florida contains only 20 to 25 percent of the uranium found in central Florida.

In response to a question on radiation effects on reclaimed lands in central Florida, the United States Environmental Protection Agency states:

"Proposed radiation protection recommendations are forthcoming. The recommendations are intended to provide health protection for persons exposed to radiation from phosphate-related land in Florida. They will provide guidance to Federal, State and local agencies and the public regarding unacceptable levels of radiation exposure in existing and new structures constructed on these land types. They should aid these groups in determining whether action is warranted to reduce levels. Guidance will be proposed at a later time to aid in radiological evaluation of undeveloped phosphate-related land. Such guidance would be directed to methods for estimating post-construction levels in structures to be built on these lands.

In developing the present recommendations only exposure due to radiation in structures was considered, since at present this appears to be the primary public health hazard. Potential crop uptake, soil runoff, and other pathways may be addressed at some future time if evaluations show these pathways to be important also. The limited available data do not show these other pathways to be a significant problem at this time"
(USEPA, EPA 904/9-78-026c, November 1978, Final Environmental Impact Statement, Central Florida Phosphate Industry, Volume III, Responses to Comments on DEIS, page 2-4)

Increased radiation effects on plants, animals and humans should not be a significant problem within the Osceola, based upon the available data.

Issue C:

Applicants are in compliance with both old and new regulations. Further delay in issuance of preference right leases is a violation of their rights to due process.

Issue Raised By:

—Global Exploration and Development Corporation
—Monsanto Company
—Elmo Hoffman, Attorney for Global Exploration and Development Corporation

Response:

On May 7, 1976, the Secretary of the Interior issued new regulations for issuance of preference right leases for mining phosphate. Three subsequent court cases (see pp. I-1 and I-2 of the Draft Supplement) have provided the Secretary with guidance in issuing preference right leases for mining phosphate.

Pertinent points of the court decisions in these cases include:

1. The Secretary cannot refuse to issue a preference right lease if the appropriate mineral value determination is made. However, the National Environmental Policy Act applies, and the setting of lease terms to protect air, water quality, and wildlife will affect the mineral value determination and is crucial to the determination of whether or not a lease is issued. In effect, the in-place value of the mineral is reduced by the cost of compliance with the lease terms.
2. The Secretary must perform his statutory duty and make a determination on lease applications before the applicant's administrative remedies are exhausted. The determination under the 1976 regulations has not yet been made.
3. In the exercise of his broad discretion to include lease terms under the regulations, the Secretary may adopt lease terms that exceed the current technological capability of the particular lease applicant.

The Secretary will utilize this guidance, the Final Environmental Statement Supplement, and the Secretarial Issue Document (SID) in reaching a decision on the preference right lease applications.

Issue D:

Economic analysis of mining versus present uses of the Osceola National Forest.

Issue Raised By:

—State of Florida
—Elmo R. Hoffman, Attorney for Global Exploration and Development Corporation
—Global Exploration and Development Corporation
—The Pittsburg & Midway Coal Mining Company
—Florida Defenders of the Environment
—Florida Audubon Society
—Board of County Commissioners, Baker County, Florida
—Board of County Commissioners, Columbia County, Florida
—Northeast Florida Regional Planning Council
—Environmental Protection Agency
—North Central Florida Regional Planning Council

Response:

U.S. Department of the Interior policy provides for the development and review of Environmental Impact Statements in compliance with the National Environmental Policy Act of 1969. Such statements are limited to the environmental aspects of proposed Federal actions and generally do not contain related policy, program, economic, or other non-environmental information which may be of importance in the decision making process. The SID, as described above, will address the economic, as well as non-economic, aspects of the decision.

Issue E:

If the Osceola is mined, can it be restored to its present productivity level, vegetative variety and land form rather than reclaimed to some other useful condition?

Issue Raised By:

—State of Florida
—Pittsburg and Midway Coal Mining Co.
—Suwannee River Coalition
—Four Rivers Audubon Society
—Florida Defenders of the Environment
—Florida Audubon Society
—Board of County Commissioners, Baker County, Florida
—Northeast Florida Regional Planning Council
—R. Patrick Elliot

Response:

The goal of reclamation of mined land within the Osceola National Forest would be the restoration of the existing resource and reestablishment of its multiple use, sustained-yield capabilities (see Chapter I, Sec. E-4 of the Supplement). Restoration of the exact numbers and composition of flora and fauna that now exist would be unattainable. However, reestablishment, as nearly as possible, of the same type of plant and aquatic communities, with the same interspersion of communities as is now present, may be attainable if the following measures are employed:

1. Research is obtained to provide the technological base required to restore to the "natural"systems of the Osceola. (See Chapter I, Sec. E-4 of the Supplement.)
2. Necessary lease terms are adopted, even though they may exceed the current technological capability, of a particular lease applicant. (See Chapter I, Sec. C-3 of the Supplement.)
3. Lands described in Chapter IV, Section E-4(c) of the Supplement are excluded from mining and associated activities, in order to protect essential habitat areas of endangered and threatened wildlife species.

6. Response to More Specific Issues

Wildlife

Issue a:

The Draft Supplement arbitrarily deletes lands from the lease application areas.

Issue Raised By:

—Global Exploration and Development Corporation
—Elmo Hoffman, Attorney for Global Exploration and Development Corporation

Response.

The Endangered Species Act of 1973 makes it incumbent on all Federal agencies to insure that actions they authorize, fund, or carry out do not jeopardize the continued existence of a federally listed endangered or threatened species (or adversely modify its Critical Habitat). Section 7 of the Act, which deals with interagency cooperation, provides for specific actions a Federal agency must take to insure that it is in compliance with the Act. One of these actions is the consultation process leading to the Biological Opinion.

The Secretary of the Interior has assigned the Fish and Wildlife Service the responsibility to render the Biological Opinion. One purpose of a Biological Opinion is to advise the responsible Federal agency on how to eliminate the jeopardy to a species by modifying its planned actions.

The Biological Opinion does not constitute "veto power"over a planned action. The ultimate decision on whether to proceed with an action, or to seek an exemption under the Act (as provided in the 1978 amendments to the Act), rests with the responsible Federal agency. Failure to comply with the Act, however, leaves the agency open to civil or criminal suits.

Regarding the Osceola, the elimination of specific areas from mining was recommended in the Biological Opinion (see Chapter XII, Appendix 1) to preclude the jeopardy to those endangered and threatened species that otherwise might have been jeopardized by mining activities. The selection of these areas was based on the results of the FWS Report (Mar. 1978) and other data, and is not considered to be arbitrary. Neither the Supplement nor the Biological Opinion constitutes a final decision to delete any land from an application.

There is, however, an apparent error in the delineation of the boundary of the southwest corner of Big Gum Swamp as indicated in Figure 21 of the Draft Supplement.

The Fish and Wildlife Service Report indicates the boundary of the Swamp to be north and east of National Forest Road 233 (subsequently renumbered 211). The Biological Opinion, in a narrative description of the boundary of the area, states "Then southerly along NF road 232 to its junction with NF Road 233. Then proceed southerly along NF Road 233 to its junction with State Highway 250. Then northeasterly along State Highway 250.." The map accompanying the Biological Opinion, however, followed National Forest Road 233A to its junction with State Highway 250.

Fig. 21 of the Draft Supplement was based on a map provided with the Biological Opinion. There are approximately 1,600 acres contained in the block of land bounded by National Forest Roads 233 on the east, 233A on the west, and State Highway 250 on the south. Roughly one-third of the area lies in the lease application areas. Fig. 21 of the Supplement has been changed to reflect the new proposed boundary for exclusion of mining.

Issue b:

The commentor believes that mining on the Osceola will be prohibited within the Big Gum Swamp and Impassable Bay RARE II areas.

Issue Raised By:

—Elmo R. Hoffman, Attorney for Global Exploration and Development Corporation

Response:

The Draft Supplement does not state that mining is prohibited within the RARE II areas on the basis of their RARE II status.

The probable exclusion of mining and associated activities from Impassable Bay and Big Gum Swamp is for protection of threatened or endangered wildlife species (see Chapter IV of the Supplement). The Impassable Bay and Big Gum Swamp RARE II areas lie, however, totally within the areas of exclusion. See the RARE II update on pg. I-9 of the Supplement for the President's final recommendations for inventoried areas.

Pending congressional action, the Forest Service normally will not consent mining on areas recommended for wilderness where the Forest Service has discretion, unless the minerals can be found and extracted by methods that will avoid surface occupancy of the kind that will degrade wilderness values.

Since the lands under application (except for 40 acres) are acquired lands, any Forest Service exclusion of certain lands from surface disturbance would be a stipulation in the leases.

Issue c:

The commentor believes that the statement, "It is possible to have significant adverse impacts to a particular species in a particular area without constituting jeopardy to the species a whole"constitutes a philosophy which would allow elimination of certain endangered species, (e.g., red-cockaded woodpecker).

Issue Raised By:

—Environmental Protection Agency

Response:

Federal agencies are mandated by the Endangered Species Act of 1973 to protect endangered species and their habitat on Federal lands. Along with the Biological Opinion prepared by the Fish and Wildlife Service in compliance with Section 7 of the Act, the Supplement assesses the unmitigated impacts of the proposed action and its alternatives under worst case conditions. In actual practice, any leases issued would contain stipulations designed to eliminate any impacts that would jeopardize the continued existence of any endangered species (e.g., designation of areas where mining would not be allowed).

Issue d:

The Supplement is made up of material repeated from the FES. The larger number of wildlife species listed in the Supplement is unnecessary, as these are not threatened or endangered species.

Issue Raised By:

—The Pittsburg & Midway Coal Mining Co.

Response:

The material was not presented in the FES. However, the Supplement addresses its charge of gathering more information relative to the effects of mining on water resources and threatened and endangered wildlife. The FWS Report (Mar. 1978), while gathering information relative to threatened or endangered species, produced a list of all wildlife present or suspected on the Forest. This more inclusive list was included in the Supplement as Appendix 6, but only the possible effects of mining on threatened or endangered species are discussed in the text itself.

Issue e:

The effect of annual clear cuts on the Osceola today is more detrimental to wildlife than would be the annual disturbance from mining.

Issue Raised By:

—Global Exploration and Development Corporation

Response:

Final harvest cuts and subsequent reforestation, as currently practiced by the U.S. Forest Service, occur in areas generally less than 100 acres in size and distributed throughout the Forest on a systematic basis over an entire 60-year sawtimber rotation. This system diversifies forest habitats and increases the amount of ecotone, recognized as critical to many wildlife species. Under such a management regime, most mobile species relocate. Individual members of less mobile species may be lost, but as the disturbed sites develop into suitable habitat through successional progression, other individuals of the species from surrounding areas reoccupy them.

By comparison, mining, as envisioned by the Cole Mining Plan, would clear 1,060 acres in two blocks each year. Operations in succeeeding years would be carried out more-or-less adjacent to the previous years' work, until commercial deposits were depleted. Under mining, clearing would be concentrated in large areas in the western one-third of the Forest, rather than dispersed in small areas over the entire Forest.

Regeneration of the nautral vegetation after mining would be inhibited due to the loss of original seed sources and root stocks in the original topsoil, which in normal reforestation practices is retained in place. The duration of the impact to wildlife, therefore, would be much longer.

Issue f:

"Critical Habitat for the panther has not been determined. We don't even know which is the best habitat"

Issue Raised By:

—Elmo R. Hoffman, Attorney for Global Exploration & Development Corporation

Response:

While Critical Habitat for the panther has not yet been legally determined by the U.S. Fish and Wildlife Service, key elements of its habitat are known. The most important of these, as recognized in the FWS Biological Opinion, are "a large area with an ample food supply, principally deer, and dense vegetation for cover" The FWS report (Mar. 1978) also recognizes these requirements and points out that escape cover is a particularly important habitat element. Both of these reports point to Big Gum Swamp and Impassable Bay as the areas of the Osceola which would most likely provide this key habitat component.

Issue g:

An increase in the number of deer following mining reclamation would benefit the Florida panther, which feeds primarily on deer.

Issue Raised By:

—Monsanto Company

Response:

While it is possible that the deer population could be increased with certain reclamation methods, a lack of this food source is not recognized as the primary limiting factor on the Florida panther. What limits the Florida panther today is the loss of large expanses of undisturbed or inaccessible terrain. Most of the reliable reports of panther sightings in Florida are made near such remote areas.

Issue h:

The FWS Report (Mar. 1978) indicates that habitat would be improved for certain species as a result of surface mining activity on the Osceola National Forest.

Issue Related By:

—Global Exploration and Development Corporation

Response:

The FWS Report (Mar. 1978) contains information on a number of species included on lists compiled by a variety of groups and organizations. (See Chapter II, Sec. B-2 of the Supplement for these sources.)

Included on these lists are many water-associated birds that would benefit from an increase in the acreage of open water—providing, as the FWS report points out, that reclamation efforts incorporate certain design features that would permit the utilization of the water areas by these birds.

Whenever terrestrial habitat is converted to aquatic habitat, there is a trade-off in impacts and benefits between land-dependent and water-dependent species. Benefits that accrue to the latter group do so at the expense of the former group.

The Supplement deals primarily with endangered and threatened species that are contained on Federal and State lists, and are therefore provided legal protection. Most of the water-associated species that could benefit from the creation of additional water areas do not appear on the Federal or State lists.

Issue i:

The Draft Supplement fails to indicate that issuance of the leases under Alternative B-1 would not satisfy the recommendations of the Biological Opinion and would not be consistent with the conservation of listed species in the Osceola National Forest.

Issue Raised By:

—U.S. Fish and Wildlife Service

Response:

A statement to this effect has been added to Chapter VIII, Sec. B-1.

Issue j:

The commenter claims that the FWS Biological Opinion states that the proposed action will not jeopardize threatened or endangered species. The commenter says: "We feel the studies show that as Mr. Greenwalt's letter states...'surface extraction of phosphate...is not likely to jeopardize the continued existence of the previously identified threatened or endangered species or result in the destruction or adverse modification of their identified critical habitats' in the Osceola National Forest or anywhere else in the State of Florida"

Issue Raised By:

—Occidental Chemical Co.

Response:

The quote is taken out of context and also imputes a scope to the Biological Opinion beyond what is actually covered. The Opinion states that the proposed action is not likely to jeopardize the species, but only if certain areas are excluded from mining. In addition, the Opinion addresses proposed phosphate mining only on the Osceola National Forest, and makes no statements concerning phosphate mining in other areas of the state. (See FWS Biological Opinion, Chapter XII, Appendix 1 of the Supplement.)

Water and Air Quality

Issue a:

The Draft Supplement used bad or inappropriate data in estimating the chemical effects of mining and beneficiation on stream water quality.

Issue Raised By:

—Suwannee River Coalition

Response:

The data used to estimate possible effects of mining and beneficiation on water quality were drawn from GS WRI 78-6; available records from the USGS Tallahassee Office; and EPA draft EIS, Occidental Chemical Co., Swift Creek Chemical Complex, Hamilton County, Florida, July 1978. Because a chemical plant was not assumed to be a part of the proposed action (see Issue cc) water quality data which displayed effects of chemical plant discharges (Swift Creek data) were not used in any water resource estimates. Care was taken to use only data that were representative of a mine and beneficiation facility not confounded by runoff from a chemical facility.

The Supplement has been changed in Chapter VIII, Sec. B-5-b(2) to read "Data from a phosphate mine (the Occidental facility, approximately 10 miles northwest of the Forest in Hamilton County) were collected and determined to be representative of discharges from normal, state-regulated mining and beneficiation (stations 7, 22 & 27 in Fig 24). Data from areas affected by chemical plant runoff or discharges were not used in developing any estimates"

Issue b:

Municipal water supplies and artesian wells would be affected by mining in the Forest.

Issue Raised By:

—Suwannee River Authority

—Board of County Commissioners, Baker County, Florida

—Global Exploration and Development Corporation

—Northeast Florida Regional Planning Council

Response:

The potentiometric surface of water in the Floridan aquifer in the area would be depressed below present levels, depending upon well spacing, location, and pumping rates. This lowering would be less than five feet at Lake City, Taylor, and White Springs, based on estimates made in GS WRI 78-6. However, the potentiometric surface of water in the Floridan aquifer may not be affected at White Springs or the center of Lake City (GS WRI 78-6, pg. 138-147). Drawdowns to the east of Taylor in Baker County would be almost undetectable from natural fluctuations. Water levels in Duval and Nassau Counties to the east would not be affected by water usage due to mining. (Also refer to Issue c, which describes surface and ground-water hydrology.)

Issue c:

Water levels of lakes, swamps and bays within the lease area and Ocean Pond will be affected by proposed mining. The chemistry of Watertown Lake may also change.

Issue Raised By:

—Florida Game and Freshwater Fish Commission

—Suwannee River Authority

—Suwannee River Coalition

—Four Rivers Audubon Society

Response:

The water quantity or quality of Ocean Pond, Watertown Lake, and swamps such as Big Gum Swamp and Impassable Bay— all at a distance of more than 300-400 feet from active mining operations—would not be affected.

The Osceola National Forest area includes three distinct hydrogeologic units, representing two freshwater aquifers with distinctly different flow patterns separated by a confining bed and known as, in descending order, the surficial aquifer, Hawthorn confining unit, and the Floridan aquifer. A description of these aquifer units, their interrelation with each other and with surface-water bodies, and the effect of potential mining on their water levels, is described in great detail in GS WRI 78-6. Essentially, the water table in the surficial aquifer is unconfined and is a subdued replica of the topography, with local shallow flow patterns intimately connected with the area's swamps, lakes and streams.

The Hawthorn confining unit effectively separates the two aquifers and controls artesian conditions of water in the underlying Floridan aquifer. Water in the Floridan aquifer has a regional ground-water flow pattern distinctly separated from the local flow patterns of water in the surficial aquifer and is not directly connected hydraulically to the swamps, lakes, and streams of the forest area.

During mining, the potential phosphate mine would affect the water-table in the surficial aquifer and the water levels of the inter-connected surface water bodies only locally. Water level effects probably will not extend beyond 300-400 feet of any of active mine operation. The 300-400 feet distance is based on observations in central and north Florida (See Chapter V, Sec. A-4, pg. V-1 of the Draft Supplement). After mining ceased, the water-table in the surficial aquifer would recover and readjust to a new position that would be determined by the changed topography and permeability of the surficial aquifer. Changes in the quality of water in the surficial aquifer would be local. Effects on the water quality and hydrologic characteristics of the Hawthorn confining unit would be less than those in the surficial aquifer. Any effects on the surficial aquifer and Hawthorn confining unit would thus be felt primarily in the vicinity of the potential phosphate mine. Any effects on the potentiometric surface of water in the Floridan aquifer would be due to pumpage at the potential beneficiation plant and would lower the artesian water levels of the Floridan aquifer. Effects probably would not be noticeable to the west and southwest of the Forest where the Floridan aquifer has been shown to be under watertable conditions. The lowering of the Floridan potentiometric surface during mining would be less than five feet at Lake City and White Springs (the nearest sources of public supply) and unnoticeable beyond these points.

Issue d:

The commenter states: "no guarantee exists that stresses of mining would not cause weaknesses which may result in sinkholes which will pollute the Floridan aquifer"

Issue Raised By:

—Suwannee River Authority

Response:

In Chapter IV, pg. IV-1, the Draft Supplement states: "The potential for sinkhole development does exist within and adjacent to the Forest. Prior to any development of surface water bodies, the presence or absence of sinkhole-related geology must be determined by a qualified geologist with appropriate experience in identifying potential sinkhole areas" There are no known sinkholes in the lease application areas. As stated in the Draft Supplement, Chapter II, pg. II-4, two small circular ponds, Ocean Pond, and a few swampy areas within the Forest are probably of solution-related origin, and suggest that sinkholes may be present. The only known sinkhole where direct recharge from surface water enters the Floridan aquifer through breaches in the Hawthorn confining unit is in Falling Creek, about four miles west of the Forest.

Issue e:

A greater hydraulic connection exists between the surficial and Floridan aquifers than indicated by GS WRI 78-6 and the Draft Supplement. If a greater hydraulic connection does exist, then a different set of hydrologic, environmental and water quality impacts may result.

Issue Raised By:

—Florida Defenders of the Environment, Inc.

Response:

The commenter suggests that the rate of recharge from the surficial aquifer to the Floridan aquifer may be in the range of 2 to 5 inches per year. GS WRI 78-6 and the Draft Supplement suggest, based on water-budget calculations, that an annual residual of from 0 to 4 inches of water is available for annual recharge to the Floridan aquifer. Based on ground-water flow calculations, a recharge from leakage is estimated to be less than one inch per year.

The commenter further suggests that aquifer test calculations could yield a higher rate of recharge, if other assumptions were made. However, the aquifer test calculations, as pointed out in GS WRI 78-6, (pp. 89-96) did not result in leakance values that were considered realistic and therefore were not used to calculate leakage or recharge from the surficial aquifer to the Floridan aquifer. As the commenter suggests, additional aquifer-test studies, if and when mining occurs, may yield greater insight into anticipated long-term effects. However, these tests would probably not radically alter conclusions of the reports completed to date. As pointed out, deepening the production well for these tests would perhaps result in better test results for characteristics of the Floridan aquifer. However, deepening the production well tests would not improve test results for the overlying Hawthorn confining unit.

The commenter suggests that evapotranspiration in this area could be about 34 inches per year. Using 34 inches per year of evapotranspiration yields a water-budget residual of 6 to 9 inches per year available for recharge to the Floridan aquifer. GS WRI 78-6 (pg. 17) states that evapotranspiration averaged 35 inches a year in a nearby ground-water basin. However, this basin, with a well-developed subsurface drainage system, was relatively free of lakes and swamps. Lake evaporation in the vicinity of the Osceola National Forest averages about 46 inches per year. In areas of extensive lakes and swamps, water loss due to evapotranspiration has been shown to average 42.5 inches per year. The average value used in the GS WRI 78-6 (39 to 40 inches or more per year) is based on the swampy nature of the Osceola and the near surface water table condition of non-swampy Forest areas. This figure was also based on values obtained under variable rainfall and streamflow conditions and represents a long-term average estimate.

The estimate used for recharge—less than one inch per year—is based on areal groundwater flow calculations. This method, because it shows what is occurring areally and temporally throughout the Forest rather than the situation only at a single location, is probably the best indication of actual recharge and vertical leakage throughout the Forest. It is certainly true that recharge west of the Forest, particularly in the Falling Creek sinkhole area, is greater than this amount. However, under the Forest and in the potential mining area, a figure of less than one inch per year appears to be most representative of actual conditions.

Issue f:

The Draft Supplement offers insufficient discussion of the air pollution effects of rock dryers. The supplement should include a mathematical model to show the air quality effects of a beneficiation facility on the allowable discharge increment within Class I air quality areas. The proposed mining and associated beneficiation could use up a significant percentage of the allowable air quality increment, thereby reducing the opportunity for future industries to obtain an air quality increment and locate in Columbia County.

Issue Raised By:

—Board of County Commissioners, Columbia County
—Environmental Protection Agency

Response:

The possible air quality effects of beneficiation is discussed in FES 74-37, pg. IV-3. It is possible that, following the issuance of leases, mining and beneficiation would use up a portion of the air quality increment as determined by the State of Florida. The use or non-use of an available air quality increment, relevent to future industrial discharges in Columbia County, would be addressed by the State of Florida at the time a discharge increment is issued. It is not possible to determine what percentage of the available air quality increment would be used by mining and beneficiation without a specific mining plan.

Mining and Reclamation

Issue a:

According to the commenter, "...the concept of two beneficiation plants on the Forest is very objectionable. It forces a mining schedule that is independent of the company's schedules and requirements"

Issue Raised By:

—Monsanto Corporation

Response:

The Cole mining plan is hypothetical and does not consider individual company schedules and requirements. The two beneficiation plant concept is based on the assumption that the lease applicants would coordinate their operations to develop economically attractive mines. This kind of coordination was envisioned because of the size of the individual holdings, annual production requirements, and geographical distribution of the deposits.

Issue b:

There is confusion over whether or not the beneficiation plants and slime settling ponds will be located within the Osceola National Forest boundaries. It is also not clear whether beneficiation rock will be shipped wet or dried.

Issue Raised By:

—Environmental Protection Agency

Response:

As stated in "Description and Quantification of the Phosphate Operation"(Chapter I, pg. I-6 of the Draft Supplement), the operation and mining methods in the proposed action are the same as those described in the original FES. In the proposal, beneficiation plants and slime settling ponds are located on private lands outside the Forest boundaries.

A hypothetical mining plan prepared by Allen T. Cole for the U.S. Bureau of Mines in 1977 proposed the construction of two beneficiation plants on the Osceola. The description and impacts of this proposal were treated as a new alternative in Chapter VIII of the Supplement.

It is not known at this time whether beneficiation rock will be shipped wet or dry. This will depend on the final market for the phosphate. This information will be required in mining plans to be developed and submitted by the companies at a later date.

Issue c:

Both the FES and the Supplement assume that the pine flatwoods habitat can be restored.

Issue Raised By:

—Suwannee River Coalition

Response:

It was not intended that either the FES or the Supplement make this assumption. The FES, in Chapter VII, Sec. E, states that "It is possible that the existing communities would never be replaced because of the major changes in soil condition"

In discussing pine flatwoods, the Supplement states in Chapter VII, Sec. E, that "It has not been demonstrated that these four habitat phases can be artifically reproduced"

The statement in the Supplement that "Although these habitats would not be irreversibly lost, the older successional stages would be lost for years to come"is inconsistent with the above two statements, and has been deleted.

Issue d:

Occidental Chemical Company, located near the Forest, has had poor success planting pines on both overburden and sand tailings.

Issue Raised By:

—Suwannee River Coalition

Response:

According to John Wester, biologist, Occidental Chemical Company, their planting program began in 1975 with 1,000 hand-planted, bareroot pines on sand tailings. In 1977 and 1978, nearly 180,000 trees were machine-planted in a variety of soil types and vegetative conditions. Survival rates range between 50% and 60%. Wester attributed much of the loss to planting techniques.

Issue e:

Restoration of commercial sawtimber production after mining will be difficult because, the commenter states, "The pH of the soil is going to be high and pines like acid soil"

Issue Raised By:

—Four Rivers Audubon Society

Response:

It is true that the pH of the soil on mined land may be higher than on unmined lands. At Occidental Chemical Company facilities near the Forest, soils on unmined land are generally quite acidic, with a pH of about 4.2 to 4.5. After mining, the pH of the soils of the mined lands range from slightly acidic (6.5) to neutral (7.0) (phone conversation, John Wester, Biologist, Occidental Chemical Company, June 6, 1979).

Worldwide, most pines occur naturally under acidic conditions. The pines themselves contribute to the acidic conditions by shedding their needles, which form a layer of acidic organic matter upon decomposition. There are examples of healthy pine stands on overburden debris and tailing sands in central Florida. Acid soil conditions are not necessarily prerequisite to healthy growth of pine trees, although there are recognized uncertainties concerning the long-term behavior of pine plantations on mined lands (see Chapter XII, Appendix 10).

Issue f:

The commenter states: "The projection that commercial sawtimber can be reestablished in the Osceola National Forest after mining is based on the evidence of revegetation in the central Florida phosphate areas. We question the need for such comparisons when the conditions vary so completely in projected methods of rehabilitation. We do not know what to expect, or what the results will be from a long rotation growth period of up to 60 years" A similar concern was expressed by the Suwannee River Coalition.

Issue Raised By:

—U.S. Forest Service

Response:

The team addressed the issue of commercial reforestation with information currently available. A discussion of this issue can be found in Chapter XII, Appendix 10. Unfortunately, there has been no controlled experimentation of commercial reforestation on phosphate mined lands. The information contained in Appendix 10 includes research conducted on native pines in the southeastern United States, including some on coal mined lands. The information it contains about slash pine establishment on Central Florida phosphate mined lands is intended only to complement the other information. It is not intended to be the primary scientific evidence demonstrating that commercial sawtimber can be re-established. However, it does add to the data base upon which this ES supplement examines the issue.

Issue g:

The commenter considers the following an incorrect assumption made in the Draft Supplement: Research on what the physical requirements are for existing vegetation in the Forest can and, more importantly, *will* be successfully done in time to provide meaningful guidance during the rehabilitation work.

Issue Raised By:

—Suwannee River Coalition

Response:

There has been little systematic research into the biological aspects of reclamation techniques for phosphate lands. Observation of the existing vegetation on mined sites in central Florida; research results from other mine reclamation situations outside of Florida; and the professional opinions of scientists and engineers involved in mining, reclamation, and forestry are available. These observations, research results, and professional opinions are detailed in Chapter XII, Appendix 10 of the Draft Supplement. Research is needed to provide the technological base required to restore to the "natural"systems of the Osceola.

The Secretary may adopt lease terms which exceed the current technological capability of the particular lease applicant. Thus, it is possible to require that the technology be developed prior to mining.

Issue h:

The statement on page I-6 of the Draft Supplement that the return of slimes and sand tailings to the mined areas would cause little or no increase in surface water area appears to be in conflict with alternative C as shown on pg. VIII-1 of the Draft Supplement.

Issue Raised By:

—U.S. Forest Service

Response:

Since there is no alternative C on pg. VIII-1, it must be assumed that the comment refers to Table 10 on pg. VIII-4. According to the hypothetical mining plan proposed by Allen T. Cole, on which the alternative in Chapter VIII, Sec. B-5 is based, about 4,600 acres of additional water area will be created by mining. This assumes a method of waste disposal that purposely involves water body construction and backfilling sand tailings and slimes into mined pits in combination with overburden. As described in Chapter XII, Appendix 9 of the Draft Supplement, a number of techniques are being developed involving backfilling mined areas with a tailings-slimes mix. By using different disposal methods, or adjusting the surface level of the backfilled areas, the water area created by mining can be varied to meet land management objectives. The text of the Supplement has been modified accordingly.

Issue i:

The additional increment to the world supply of phosphate due to mining the Osceola deposit should be included and discussed in the supplement.

Issue Raised By:

—U.S. Forest Service

Response:

The Bureau of Mines reports in January 1979 *Phosphate Mineral Commodity Profile* that world demand for phosphate rock was 116 million metric tons in 1977. The publication projects world demand to increase to between 200 and 250 million metric tons by 2000. Data is not available at this time to determine accurately the increment to world supply created by production on the Osceola. Assuming demand would be sufficient to absorb production on the Forest without reducing production rates elsewhere, annual production on the Osceola would represent about 2 percent of world production if full production on the Forest were achieved by the mid-1980's. By 2000, production on the Osceola would represent about 1.5 percent of world production.

The Bureau of Mines publication forecasts that production in Florida will reach 48 million metric tons by about 1985, and decline to less than 40 million metric tons by 2000. Assuming demand would be sufficient to absorb production on the Forest without reducing production rates in the rest of Florida, Osceola production would represent about 7 percent of the State's production in the mid-1980's, increasing to over 8 percent by 2000.

In 1977, of the 47,256,094 metric tons of marketable phosphate rock produced in the United States, 40,575,041 metric tons were produced in Florida.

Issue j:

The latest evaluation of phosphate deposits in Florida indicates that identified reserves are 4 billion short tons rather than the 1.2 billion short tons estimated by the Bureau of Mines in Int FES 74-37.

Issue Raised By:

—Florida Defenders of the Environment

Response.

In the Zellers-Williams report cited in the comment, *Evaluation of the Phosphate Deposits of Florida Using the Minerals Availability System* (Bureau of Mines Open File Report 112-78), "reserve" and "resource" are defined as follows. A reserve is "that *portion* of the identified phosphate rock resource which can be economically and legally extracted at the *time* of determination" A resource is "specific deposits of phosphate rock, identified in terms of recoverable product"

The Zellers-Williams report estimates total identified *resources*-not reserves-in Florida to exceed 4 billion short tons. The 1978 market price for beneficiated rock in Florida averaged $15.78 per short ton. Based on the adjusted market price for 1978, according to the identified resource estimates in the Zellers-Williams report, identified *reserves* are slightly less than the 1.2 billion tons estimated by the Bureau of Mines in FES 74-37.

Issue k:

The Osceola deposits can be held in reserve while phosphatic concentrations on the ocean floor are developed as an alternate source of phosphate.

Issue Raised By:

—Four Rivers Audubon Society

Response:

While some ocean mining of phosphoritic nodules off the Pacific Coast has been done on an experimental basis, the technology has not yet been applied commercially. A feasibility study has been conducted on dredging for phosphate off the coast of Georgia. The study report is in draft. (Also see Issue l.)

Issue l:

The commenter considers the following an incorrect assumption made in the Draft Supplement: If the lease applications were denied, alternate sources would have to be developed to make up the "deficit"or consumption would have to be reduced. (See pg. VIII-14 of the Draft Supplement.) The commenter appears to contend that by reducing phosphate exports, the lease applications could be denied without having to develop alternate sources or reduce consumption.

Issue Raised By:

—Suwannee River Coalition

Response:

The assumption on pg. VIII-14 of the Draft Supplement has been updated to reflect current market conditions.

Phosphate exports are important to meeting world demand for fertilizer supplies and may be exchanged for raw materials that are scarce in this country. They finance future development within the industry and help to reduce the country's balance of trade deficit. As domestic reserves are depleted, total phosphate exports will begin to decline during the 1990's.

The possibility of reducing phosphate exports to compensate for production loss incurred by not mining the Osceola deposit is not a legal basis for denying issuance of the leases. The decision to deny or issue the leases will be based on the determination of a "valuable deposit"as defined by 43 CFR 3520.1-1(c). (See Chapter I, Sec. B-1 of the Draft Supplement and Chapter XII, Appendix 2.)

Issue m:

The Draft Supplement assumes there will be no attendant chemical plant associated with this mining. This is not justified anywhere in the documents.

Issue Raised By:

—Suwannee River Coalition

—Board of County Commissioners, Columbia County, Florida

—Environmental Protection Agency

Response:

An alternative that included a chemical plant was not included in the Draft Supplement because a chemical plant is not essential to the proposed action. Rock will be processed at existing chemical plants in the state of Florida. Chemical plants exist in Tampa and Jacksonville. Any new chemical plant proposed at a later date for location on Federal land would require an additional environmental assessment.

Issue n:

The Draft Supplement incorrectly assumes that the storage of slimes off the Osceola National Forest would not increase the surface radiation levels in the Osceola National Forest.

Issue Raised By:

—Suwanne River Coalition

Response:

The intent of the Draft Supplement was to indicate that surface radiation levels on the Forest would not be increased from this source. The wording in Chapter III, Sec. A-1 has been changed to clarify this point.

The commenter should also refer to the response in issue o.

Issue o:

The Draft Supplement incorrectly assumes that the replacement of overburden on top of slimes would return surface background radiation to near normal levels.

Issue Raised By:

—Suwannee River Coalition

Response:

The comment was raised in relation to the new alternative in Chapter VIII, Sec. B-5, in which the slime and sand tailings are incorporated as backfill to reclaim mined-out pits. Overburden would then be placed on top of this incorporated mixture (see Chapter VIII, pg. VIII-13, Mitigating Measures and Stipulations under Sec. B-5).

The team recognizes that since the natural radiation equilibrium will be disturbed, some increased radiation may occur as a result of mining. Radioactive materials typically are concentrated at the base of the leached zone and associated with the phosphate minerals. (See pg. 2-915, Occidental Chemical Co. Swift Creek Chemical Complex Hamilton County, Florida Draft EIS, July, 1978, by the Environmental Protection Agency (EPA).) During reclamation, therefore, small quantities of the matrix may be redeposited near the ground surface (Ibid, pg. 2-926). However, the leached zone in Hamilton County is considerably thinner than in Polk County. There is a higher probability that the leached zone material will not be concentrated near the ground surface during land reclamation (Ibid, pg. 2-291).

The EPA Draft EIS further states that the sands and slimes used in mined-land reclamation contain approximately one-third of the uranium originally present in the matrix (Ibid, pg. 2-926). The ambient levels of on-Forest radioactivity could be elevated if these materials are used in reclamation (Ibid, pg. 2-921). The wording in Chapter VIII, Sec. B-1-c(1) of the Draft Supplement has been changed as follows: "As part of the reclamation process, the clay slimes and sand tailings would be placed at the botton of the mined-out areas —their natural zone of occurrence. The placement of the overburden on top of the slimes and sand tailings would reduce radiation from these beneficiated materials. The net result of this reclamation process might elevate the radiation above ambient levels, but this increase would not be significant"

Similar observations are made in the EPA Draft Supplement cited above (Ibid, pg. 2-291) and on page II-12 of the final Swift Creek EIS dated September 1978 (EPA 904/9-78-020).

In addition, the stipulation for mitigating radiation in Chapter VIII, pg. VIII-13 of the Draft Supplement has been changed as follows: "Clay slimes and sand tailings will be returned to the mined areas and utilized in reclamation activities. The clay slimes and sand tailings will be incorporated into a mixture and placed in the bottom of the mined-out areas and covered with overburden"

This wording reflects more accurately the reclamation procedure of the new alternative and assumes that the overburden will act as an effective shield to reduce radiation levels. (See pg. 104 of the EPA Draft EIS.)

The commenter is also directed to see the responses to comments on page 4-56 and 4-57, Central Florida Phosphate Industry EIS, Final, EPA 904/9-78-026c, Nov., 1978, which discusses radiation hazards to human health.

Issue p:

The Supplement should present clearer evidence of the location, extent, and value of commercially mineable phosphate deposits in the Osceola. The ten test holes drilled by the U.S. Geological Survey as part of its hydrological study provide little basis for factually determining the extent and value of commercial mineable phosphate within the Forest.

Issue Raised By:

—State of Florida

Response:

The logs of the ten test holes drilled in the Forest by the U.S. Geological Survey were published in 1978 in U.S. Geological Survey Open-File Report 78-799, by James A. Miller, entitled "Geological and Geophysical Data from Osceola National Forest, Florida" Only seven of the ten holes were in the phosphate deposit areas shown on the map referred to by the commenter (Map 2, pg. XI-5 of FES 74-37). This map, furthermore, is qualified by the statement that "within these areas (phosphate deposits) there are large or small areas of non-commercial value" The original estimate of the location, extent, and value of the matrix was determined on the basis of prospect drilling from 1965 to 1970 on the Forest and adjoining lands by the private companies. The test holes drilled by the Geological Survey during its hydrological investigation were for the purpose of defining the areal geology and hydrology, not for the purpose of refining the description of the ore matrix. As FES 74-37 states on page I-12, "...to develop logical and orderly mining and reclamation plans, drill holes on 2½ acre centers are required to delineate the ore bodies.."

As stated in Chapter XII, Appendix 2 of the Supplement, under 43 CFR 3251.1, the permittee must make an initial and final showing of the location, extent, and value of the deposit before the lease application can be finally approved. The initial showings have been made. However, as a final showing, the permittee must present sufficient evidence to show that there is reasonable expectation that his revenues from the sale of mineral will exceed his cost of developing the mine, extracting, removing, and marketing the mineral. The permittees have not yet been requested to submit final showings.

Miscellaneous

Issue a:

The commenter asks whether all of the mitigating measures in Chapter IV of the Supplement will become stipulations.

Issue Raised By:

—Environmental Protection Agency

Response:

All of the mitigating measures in the Supplement and the original FES are recommended for inclusion as stipulations in any leases that may be issued. In the Mitigating Measures section of the Overview, the text has been amended to reflect the fact that the exclusion of mining from certain areas of essential habitat for threatened or endangered species is a recommendation.

Other lease stipulations may be recommended at a later date by the surface management agency of the Osceola—the U.S. Forest Service—and by the U.S. Geological Survey and the U.S. Army Corps of Engineers. All recommended special stipulations, bonding, reclamation requirements, and royalty rates for any leases that may be issued will be outlined in the Technical Examination/Environmental Assessment Report to be prepared at a later date. The Secretary of the Interior will ultimately approve any stipulations in the leases.

Issue b:

The section on RARE II areas should be updated to reflect the Administration's proposal.

Issue Raised By:

—U.S. Forest Service

—State of Florida

Response:

Chapter I, Sec. F-4 of the Supplement has been updated.

Issue c:

The Draft Supplement omits any discussion of the role, responsibilities and possible jurisdiction of the Corps of Engineers over mining and other activities in wetlands.

Issues Raised By:

—Corps of Engineers, Jacksonville District, Florida

Response:

The first paragraph of Chapter IV of the Draft Supplement, pg. IV-1, states that all Federal State and local laws and regulations that pertain or could relate to phosphate mining will be applied and enforced. Any regulatory role, responsibility or possible jurisdiction of the Corps of Engineers would be applied through normal administrative procedures of the Department of the Army.

Under Section 404 of the Federal Water Pollution Control Act (FWPCA: 33 USC 1344), a Department of the Army permit may be required for mining activities on wetlands. If any of the preference right leases are issued by BLM, and if the applicant requests a Department of the Army permit, any jurisdiction of agencies involved in the identification and protection of wetlands within the confines of the Forest would have to be determined at that time.

Issue d:

Delineation of wetlands, effect of wetlands reduction, postmining wetland configuration, and reclamation of wetlands must be determined at this time.

Issue Raised By:

—Environmental Protection Agency

Response:

As referenced on pg. IV1 of the Draft Supplement, and in the response to Issue c, above, if leases are issued, all Federal, State, and local laws would be followed.

If leases are issued, a mining plan would be developed and specific wetland classes identified within the appropriate administrative authorities. At this time, it is not possible to assess the effect of mining on wetland classes.

Issue e:

The documents do not adequately assess the relationship of phosphate mining to the State Plan as required by CEQ Guidelines.

Issue Raised By:

—State of Florida

—North Central Florida Regional Planning Council

Response:

In Chapter I, Sec. 5 of the Supplement, a new subsection has been added to discuss the Florida State Comprehensive Plan. Objectives and policies concerning management and disposal of federally owned minerals were considered in preparing the Supplement.

7. Written Comments

Written comments from Federal, State, and local agencies; organizations; and individuals are indexed and included in the following pages.

All written comments received in review of the Draft Supplement are on file and are available for public review at:

Eastern States Office
Bureau of Land Management
350 S. Pickett Street
Alexandria, Virginia 22304

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ORIGINAL

UNITED STATES DEPARTMENT OF INTERIOR

BUREAU OF LAND MANAGEMENT

PUBLIC HEARING

ON

DRAFT ENVIRONMENTAL IMPACT STATEMENT SUPPLEMENT

ON

PHOSPHATE LEASING ON THE OSCEOLA NATIONAL FOREST

City Hall Auditorium
Lake City, Florida

May 9, 1979

7:00 o'clock P.M.

MR. UDY (Continued)

So, we will begin with Mr. Ernie Caldwell, Commissioner from Polk County, Florida. Mr. Caldwell.

This is Mr. Ernie Caldwell, Commissioner, Polk County, Florida.

MR. ERNIE CALDWELL: As stated, I'm Ernie Caldwell. My occupation is Vice Chairman of the Board of County Commissioners of Polk County, Florida.

As many of you are aware, Polk County is the world's largest producing phosphate county in the world. Phosphate industry directly employs 8,500 people from Polk County, that is 8,500 residents.

Phosphate industry generates from those jobs approximately 50,000 related jobs supporting the industry in Polk County, within Polk County alone. Phosphate industry operates at present 16 active mines, 9 active chemical plants. Polk County is still a pleasant place to live with all this activity. In fact, we have got one of the largest growth rates of any county in the state of Florida.

Gentlemen, I appear before you tonight largely because it is my firm conviction that a

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MR. CALDWELL (Continued)

Polk County businessman is being severely damaged by our Federal Government. This Polk County businessman is Mr. George C. Brooks, Global Exploration and Development Corporation. I have had the pleasure of knowing Mr. Brooks for approximately seven years.

I became acquainted with Mr. Brooks over some environmental matters, and I express to you that to my knowledge Mr. Brooks has an environmental record second to none, the mining industry in Polk County.

I have personally observed an operation independently owned, constructed, and operated by Mr. Brooks, which adjoined the city limits of Lakeland, Florida. It also adjoined some residences that had a value, at that time, of $60,000 to $70,000, in that range.

His mine operation comes within 200 to 300 feet of the bedrooms of those homes. I as a resident and I as a Polk County Commissioner have yet to receive a complaint about Mr. Brooks' operation. In fact, the property that has Mr. Brooks' mine has now been reclaimed and was reclaimed

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MR. CALDWELL (Continued)

by Mr. Brooks. Some of the property sells for as high as $30,000 and $40,000 per acre. So, reclaimed phosphate land is valuable. It's valuable to us in Polk County. We in Polk County have used mining of phosphate as a temporary disturbance of land.

Polk County has 56 public parks throughout our 2,035 square mile county. And a multitude of our parks are the result of previous phosphate mining. We have one park, in particular, that is 740 acres. It would not be enjoyed by the residents of Polk County were it not for mining operations in the park.

The significance of mining to Polk County, I cannot express to you in minutes. I cannot express to you in 20 minutes. Polk County enjoys three main industries: phosphate, citrus, tourism and cattle; four main industries, excuse me.

Phosphate is our main supporting industry in Polk County. It's our main industry economically.

My question before you in terms of Mr. Brooks as a Polk County resident is this: What

MR. CALDWELL (Continued)

allows the Federal Government to procrastinate over a period of ten years on this issue? If it were before local government, it would be resolved in a matter of 18 months, I can assure you. This question I pose tonight. Mr. Brooke has endured this problem for ten years. I think this is adequate time to resolve the issue. I urge you to express to your superiors an immediate resolution, if that not be the permit to mine, but restitution for the damages that have been caused. Thank you very much.

MR. UDY: That was Mr. Caldwell. Now we have Harry Martin, Florida Game and Fresh Water Fish Commission.

MR. HARRY MARTIN: Thank you, Mr. Udy.

Ladies and gentlemen, we appreciate, on behalf of the Florida Game and Fish Commission, the opportunity to comment on this statement. I have a prepared statement here and I will read it into the minutes, at this time.

The Game and Fresh Water Fish Commission has been deeply concerned over the pending issuance of preference right leasing or the extraction of

MR. MARTIN (Continued)

phosphate on the Osceola National Forest. We have voiced this concern numerous occasions following our review of the Draft Environmental Impact Statements, which was a comprehensive evaluation of the direct effects of strip mining on the forest. The Commission unanimously passed a resolution dated January 11, 1974, opposing any and all phosphate mining and extraction from within the confines of the Osceola National Forest.

In the five years since this resolution was adopted and particularly in the last three years, we have gained many insights into the existing phosphate strip mining operations in Florida, and their environmental impact through conducting environmental assessments of proposed new mining areas in connection with states and federal permitting processes. From this perspective, and considering the information released last year in the U.S. Geological Service Hydrology Study and the current Draft Supplement, we remained deeply concerned over strip mining in the Osceola and vigorously oppose the issuance of these preference right leases on the National Forest

MR. MARTIN (Continued)

cooperatively managed by the Florida Game and Fresh Water Fish Commission and the U.S. Forest Service, and the Osceola Wildlife Management Area.

We consider this area of extreme importance as a recreational and a hunting resource, since it supports a major percentage of the public hunting in the Commission's northeast region, by virtue of its size, habitat, value and proximity to a major population center. In 1976, a total of 86,000 man-days of hunting occurred on the Osceola, that's 86,000. Approximately 80 percent of the forest is open to still hunting, making it the largest still hunt area, that means no dogs in that particular part. The largest still hunt area and providing 40 percent of the still hunt opportunities in the entire region; that is in 16 counties in the state of Florida.

A comparison of hunters' success for deer on flatwood types still hunt areas in the region on the Osceola indicates that during 1976, '77, hunting season, the Osceola's success rate was the highest of all management areas in the region. These facts emphasize the importance of Osceola

MR. MARTIN (Continued)

to the hunters in this particular region. The loss of up to 52,000 acres of this type still hunting opportunities as a result of phosphate mining, would result in the displacement of approximately 3,000 hunters. This would mean a net loss of hunting opportunities since all other areas open to still hunting in the region are at the hunters' saturation point, now. Some of the displaced hunters would utilize the remaining unmined portion of the Osceola, because of the quota hunt restrictions there would only be four to five hundred additional hunters that would be allowed to this other part of the area.

It's clear from the wealth of information available on the impacts of existing phosphate mines, the Environmental Impact Statement for the proposal, public testimony, and the newest hydrology and endangered species reports that phosphate and surface mining in the Osceola National Forest would be catastrophic to the natural systems that support both wildlife and human usage.

The proposed mining would directly destroy over 30,000 acres of wildlife habitat, resulting

MR. MARTIN (Continued)

in severe disturbances to the Black Bear population of the forest, and the state, for that matter; the elimination of over half of the turkey population and possibly one-quarter of the deer herd, as well as significant losses to populations of other game and non-game species, such as the feral hawk, the fox, the bobcat, squirrels, raccoon, otter, quail, and the possible extrication of several endangered or threatened species from the forest.

Mining operations would also require access roads, slurry pipelines, and power line right-of-ways, which would further impact wildlife populations.

Creeks in the lease area, notably, Deep Creek, Robinson Creek, and Falling Creek either will be physically disrupted by mining or indirectly affected by the diversion of natural runover by the watershed boundary alterations, discharges of low qualifity effluence, potential slime dam breeks, and the changes in flow patterns from predicted lower ground water levels.

MR. MARTIN (Continued)

Fisheries resources in these creeks will be eliminated or degraded with concomitant losses of productivity normally contributed to the Suwanne River, adverse impacts to ocean poinds, and the Watertown Fish Management Area are also quite possible.

In summary, any activity having impacts of this magnitude would be in direct conflict with our responsibilities under the Florida Constitution to manage, protect, and conserve wild life and animal life and fresh water aquatic life. Therefore, the Commission opposes the issuance of these leases.

MR. UDY: Thank you, Mr. Martin.

Now, we have Frank E. Philpott, Chairman, Suwanne River Authority.

MR. FRANK E. PHILPOTT: I'm glad to be here, and I'm sorry the other 40,000 or 50,000 people interested in this are not here, because, probably, they don't know about this meeting.

I don't think there is anything in the Gainesville Sun today, that has 100,000 subscriptions. I'm not sure if there was much in the Florida

MR. PHILPOTT (Continued)

Times-Union. So, our crowd is not here, whether for or against these leases. But I'm glad the man from Polk County is here. I'm from Alachua County and I don't always agree with Polk County.

The subject that I have for the remarks tonight, the subject itself, is Strip Mining in Osceola National Forest Should Not Be Permitted.

Use of public land for mining phosphate is not in the best public interest. So say such well-known Floridians as Lawton Chiles, Richard Stone, Reubin Askew, Robert Shevin and Bill Gunter. This is also the official stand of the Florida Legislature, the Florida Department of Natural Resources Division of Recreation and Parks, Florida Game and Fresh Water Fish Commission, Florida Defenders of the Environment, the Sierra Club Florida Chapter, The Suwannee River Systems Association, the Suwannee River Coalition, the Florida Wildlife Federation, and the Suwannee River Authority, and the Lord knows how many others.

Mining firms have applications to strip mine 52,000 acres or a third of 157,000 acres of the Osceola National Forest. This national

MR. PHILPOTT (Continued)

treasure begins at the city limits of Lake City and extends northward approximately 12 miles and northeasterly 18 miles. This is a tremendous demand on public land by private companies.

According to a U.S. Department of the Interior environmental report filed three years ago, the municipal water supplies and artesian wells of Lake City and White Springs will be affected by mining in the Forest. A portion of the mineable land is within the 100-year flood prone area of the Suwannee River. "Flood waters from the Suwannee could inundate swiftly and erode the dikes and create spillage of sediment and slime pond materials, thereby polluting the Suwannee River," the report stated.

Twice in the last 12 years, slime spills in Florida's Peace River have killed millions of fish. Is this destined also for the Suwannee?

What will be the effect of mining on the fresh water table? Don Hughes of the U.S. National Forest Service told the Live Oak, Florida Independent Post in July 1976 that the area's water table is only one foot beneath the surface.

MR. PHILPOTT (Continued)

In the heart of Florida's phosphate country over a 20-year period, the water table in Polk County is said to have fallen 60 feet. The result has been receding lakes, abundant sinkholes, and the threat of salt water intrusion. Now, I don't know what Don said two or three years ago, but he is here tonight to back it up, I'm sure. I hope his words don't come back to haunt him sometime.

Introduction of contaminants into the water supply is possible by way of sinkholes. No guarantee exists that stresses of mining would not cause weaknesses which may result in sinkholes which will pollute the Florida Aquifir..

National forests should be primarily for the people for hunting, fishing, camping, boating, vacationing, and other recreational pursuits to relieve the strain of modern living. Let us see that the wishes and concerns of the people of the State of Florida prevail over the desires of a few private phosphate companies.

It will be not only the citizens of Florida and the nation, but their children and

MR. PHILPOTT (Continued)

their children's children who will benefit. Thank you very much.

MR. UDY: Thank you, sir. Mr. George Brooks, Global Exploration and Development Corporation.

MR. ELMO HOFFMAN: My name is Elmo Hoffman. Mr. Brooks and I would like to change places. We are both speaking for Global.

As I said, I'm Elmo Hoffman, a lawyer from Orlando, Florida. I represent Global Exploration Development Company. The little company with a big name. Global is really a relatively small company in the business. Its chief asset is George Brooks, who will speak to you in a few moments after I finish. This is a man with a mining engineering degree, probably, in my estimation, the foremost expert on phosphate mining in Florida. He has 25 years in phosphate mining, and five years in coal mining. Prior to starting his own small company, approximately 15 years ago, he was with some of the larger companies in helping them to develop how to

MR. HOFFMAN (Continued)

appropriately do phosphate mining with the proper eye to environmental concerns. He has been struggling since 1964 to get through the procedures with the Federal Government to take advantage of the monies he has expended to find phosphate on this National Forest, and did find it.

I'd like to say a few words about what Mr. Philpott just said, because I happen to be one of those members of the public who very much enjoys swimming, hunting, hiking, fishing, and camping. I'm out practically every month. Besides being a lawyer, I happen to be a scout leader of Troop 123 in Orlando. We spend a great deal of time looking for good places like that to go.

I'll like to also address myself to Mr. Martin's comments from Fish and Game. The things that Mr. Martin raises as horror shows that are going to happen are just not true. We will not lose 52,000 acres to the good benefits that Mr. Philpott and Mr. Martin are talking about, because that is not the way we are going to do it. We will not destroy any 30,000 acres of deer,

MR. HOFFMAN (Continued)

bear or other game habitat.

Now, I think the thing that we are really here about tonight is this proposed Supplemental Environmental Impact Statement. If that is what we are going to talk about, let's talk about that. Florida Fish and Game Commission, if you are going to come up with these statistics about killing bears and bears' habitats and the deer's habitats, let's see your studies on it.

The United States Department of the Interior, Fish and Wildlife Service, and this is a report in this, the first appendix in here. Here is what we are talking about. Here is what we are debating about. The first appendix here is from the Director of the Federal Fish and Wildlife Service, and he says, "After careful review of the findings by consultation teams" -- and what the Federal Government did was send teams down on each kind of the 20 allegedly endangered species, and take a look at it and deal with facts, not speculations. "After careful review of the findings of the consultation team, it is my biological opinion, subject to the conditions

MR. HOFFMAN (Continued)

identified herein, that the proposed project is not likely to jeopardize the continued existence of the endangered and threatened species. Listed above are the results from the destruction or adverse modification of their critical habitats."

Now, this is the most recent study done and this is the fact based upon a statistical study and actual field observation. There is one or two animals or wildlife residents that we need have concern with. And one is the Florida panther, and the other is the woodpecker. Both of which are mentioned on the report on page 42; I think it is on a map. Here is what they say about the Florida panther. We are so concerned about our fellow creatures, I'm concerned about our fellow creatures, but I'm concerned about human beings, too. The Florida panther was listed as an endangered species in the Federal Register in 1967. Critical habitat for the panther has not been determined. We don't even know which is the best habitat. The entire Osceola National Forest is a potential panther

MR. HOFFMAN (Continued)

habitat, but certain areas appear to be the most suitable areas, because they offer greater protection from human disturbance.

Neither the Florida panther recovery team, the group conducting the endangered species study, nor the Okeefenokee Refuge personnel have confirmed reports of panthers even being present in the area. There have been two reports of panthers in the Forest, one in '74 and one in '76.

Now, what we are talking about is balancing environmental interests, environmental concerns. What we are talking about is recognizing that man is also a part of the environment. What we are talking about, as Mr. Philpott said, is a "national treasure". Part of that "national treasure" is the ability to feed our people.

Phosphate is not something that we dig out of the ground just to make a profit for the phosphate miners. Phosphate is a critical product, necessary for us to eat in the future. I'm concerned about my children and grandchildren, too.

MR. HOFFMAN (Continued)

I don't want us to have to go to Morocco or Russia or make any deals with Russia to get phosphate. I want us to be able to have the phosphate here to grow the food we need to eat.

We understand there will be a statement from the American Farm Bureau directed to you, Mr. Udy, about the farmer's critical concern for phosphate. We suggest to you from Global that the whole matter be dealt with on a logical, factual basis, and not upon the basis of emotions. And certainly not upon the basis of some unsubstantiated feelings.

We hear that a lot of different people in state government may be against this. I have a very good friend named Jay Landers, who confided to me on the surface that on the surface of it we shouldn't mine phosphate out of a national forest. That sounds right, it sounds right to me, but when we try to balance this which is the legal case that we are also familiar with, including the Berkland decision by Judge Green. It's the job of the Interior Department to balance the

MR. HOFFMAN (Continued)

conflicting concerns and needs of humanity with the needs of the environment. And that is what we hear about. We suggest that man has a right to live and use the environment, but with the proper motivation and the proper concerns for protecting the delicate balance of nature.

If you are going to talk about this report, let's at least read this report and see what it's got in it. The people from the U.S. G.S. dispute what you heard from the older report about the effect on the water table. True, in Polk County there has been a 60 foot drop in water table. Actual studies done by the experts who know how to test these things suggest in this report that the maximum effect, and this is doubly what they actually tested, would be a possible five foot drop in the water table. That their actual test coming up are two and a half and they gave some fudge factor to be safe to see how bad it was.

The word "strip mining" is a buzz word, sounds awful. What's being proposed in here by Global and the other three companies and in

MR. HOFFMAN (Continued)

conjunction with this direction from the Secretary of the Interior, is a method to use this to a national asset which is much more important to every one of you than fuel oil is, I guarantee you. If you want to do some economic and demographic studies, you are going to find that this phosphate is much more important to your life than Saudi Arabia and oil. And we are going to face a time in this next 15 to 20 years where your farmers are going to be crying for the ability to produce food on something that is hard to find.

This proposal is to try to get it done and preserve the habitats of the woodpecker, if he is there, and preserve the habitats of any other wildlife that might be threatened. Let's talk about what's really threatened, not something we dream up that might happen.

Mr. Udy, we take exception to one particular area of this report, and we understand that is what we are really supposed to address ourselves to instead of making emotional speeches between me and the State Fish and Game. There

MR. HOFFMAN (Continued)

seems to be, I think it's on IV-4, there is a map outlining Impassable Bay and Big Gum Swamp. There is nothing in the appendix to support the arbitrary drawing of those lines around Impassable Bay and Big Gum Swamp.

We will deal with that in a written response to the Interior on that. I just wanted to mention that that is the area that we will be dealing with in our written response. We agree that the reports support and set aside in some area as those are set aside, but do not agree with where those lines have been drawn. Thank you very much.

MR. UDY: Thank you, Mr. Hoffman.

Now, Mr. Brooks.

MR. GEORGE C. BROOKS: My name is George C. Brooks. My address is 1414 Collins Lane, Lakeland, Florida 33803. I am President and Founder of Global Exploration and Development Corporation, one of the lease applicants in the Osceola National Forest.

For the past 30 years I have held

MR. BROOKS (Continued)

responsible positions in the development and production of coal and phosphate rock, energy and food related materials, for the benefit of mankind. I am proud of this necessary and worthwhile contribution to society. I am equally proud to be a supporting member of the Sierra Club and member of the National Audubon Society supporting aims and purposes under which these organizations were founded.

In 1963, as Director of Mining and Exploration I guided a small California oil company with $5 million annual sales to a phosphate deposit on the western half of the ore body under discussion. This effort has resulted in substantial economic benefit to North Florida.

Leaving this company in 1965, I formed my present company with high hopes under the spirit of American free enterprise.

Shortly, thereafter Global entered into agreement with the Bureau of Land Management, with good faith and intent in purpose by investing my life's savings in the form of annual rental payments to BLM for approximately 20,000 acres

MR. BROOKS (Continued)

within ONF under exploration permits as provided by existing law. This was and is a good law in that it provides the orderly development of our nation's resources by private and free enterprise with opportunity afforded small companies along with large corporations.

Incidentally, the Federal Government acquired the approximate 157,000 acres within ONF boundaries from private owners for $5.04 per acre. From the inception of permitting all companies acting in good faith, under the law, will have expended upward to this amount in rental, drilling, overhead costs along with litigation and investigative costs in acquiring rights already established by law.

Since 1969 or a decade since the first leases were applied for and certification of valuable deposits discovered were made U.S.G.S. the scenario in the ONF has been one of orchestrated delay on lease issuance supported by conjecture, supposition and outright misrepresentation of happenings if surface extraction of the valuable

MR. BROOKS (Continued)

phosphates would occur.

For example, a former elected Florida official stated, according to a news release, "permission to mine phosphate in the Osceola National Forest in Northeast Florida would ruin the recreational area for generations,".

FACT: Based on concurrent surface extraction of minerals, from a minimum of two sites, activity would temporarily disturb approximately less than one-half of 1 percent of the total area or 1,000 acres annually. By comparison, the U.S. Forest Service clear cuts over twice this amount or 2,000 acres annually. For this, a question posed which should be self-answering with some common-sense reflection. What happens to the wildlife over this 2,000 acre area or 3.13 square mile area clear cut each year? The obvious answer would be, they migrate. Any good miner or forester would take appropriate action in protection of any actual active nest in such an area. From a recreation standpoint, it is perceived that in any given 5 year period from 5

MR. BROOKS (Continued)

7,000 acres would be involved leaving over 150,000 acres for present recreational and timbering use. Reforestation would take place on the 5 to 7,000 acres with fresh water lakes created during reclamation providing fishing, swimming and boating for centuries to come. In addition, habitat would be improved for certain species according to a comprehensive report by U.S. Fish and Wildlife Services concerning phosphate activity in ONF.

Another example, a U.S. Senator stated on January 17, 1974 and I quote, "The lease price is ridiculous. They're talking in terms of $121,000 for the entire forest."

FACT: Based on production rate of 4,000,000 tons per year emanating from a minimum of two mine sites and assuming the present royalty of 5 percent applied to a conservative average market value of $30.00 per ton between 1985 and 2,005, six million dollars per year would be taken in by the Federal Government. In turn, the Federal Government would, as provided by law,

MR. BROOKS (Continued)

return 37 1/2 percent of these monies or $2,250,000 annually back into the treasury of Columbia or Baker Counties for public roads and education. In addition, another 10 percent or $600,000 annually would return earmarked for construction and maintenance of National Forest roads and trails. This information has been withheld from the people of Columbia and Baker counties by elected officials for reasons known only to them. Employment and benefits derived from this source alone could approach $60,000,000 for the 1985 - 2005 period. Elected officials of any Florida county should welcome this windfall for their people.

Still another example, are statements made by elected state and federal officials and employees attempting to discredit dedicated scientists from U.S.G.S. and U.S. Fish and Wildlife in their report which substantiates facts those of us experienced in the business already knew, vis-a-vis; the draw down on the aquifer would be five feet or less and long term disturbance on

MR. BROOKS (Continued)

less than 18 percent of the total forest area would be minimal. Actually, many benefits will be derived in the areas of future pine production, wildlife habitat, water management and recreation provided cooperation is achieved between the operators, U.S. Forest Service, U.S. Fish and Wildlife and other interested and responsible environmental groups.

These are but a few of the totally inaccurate statements and contentions made over the past decade, spanning three administrations, regarding surface extraction of phosphate minerals within the Osceola National Forest.

Based on recent articles appearing in the media and impression from others regarding conversations with government officials it appears attempts are being made to circumvent our rights by arbitrary deletion of lands from various lease application blocks, thus attempting to create a non-economic mining condition for the companies.

Recognizing the commercial value of our phosphate and in view of the level of activity

MR. BROOKS (Continued)

conducted on the western portion of the ore body since 1966, I vigorously oppose any attempt by the responsible agencies and officials thereof to use whim and arbitrary means to circumvent our rights in attempts to infer and adjudge our deposits are not valuable for commercial development. We intend to utilize every appropriate and legal means to protect our interest in this matter.

Few, if any, in this hearing, can perceive the mental and physical anguish these repeated, unwarranted delays have wrought on this witness. Further, such callous delay will bankrupt a small company. If those responsible are successful by whatever means in circumventing the written law by withholding our rights in the Osceola National Forest, without just and equitable compensation, then our Department of Interior has reached a low point in history since founding in 1849.

All of the present lease applicants have demonstrated responsible attitudes toward the

MR. BROOKS (Continued)

environmental infrastructure, insofar as possible, in their mining operations. Pittsburgh and Midway Coal Company demonstrated sound reclamation practices even before mandatory reclamation laws existed. My own production and environmental record is second to none in the Florida phosphate industry.

Now then, in view of the fact the Osceola will be mined at some point in time, will the responsible environmental community continue in the attempt to block these responsible lease applicants only to have a company mine in the future with perhaps a record of falsifying reports or involvement in other detrimental practices, environmentally speaking?

I challenge all agencies and officials to move forward in a positive and responsible manner with us to achieve great economic benefit for the state and community and create a landmark project, through intelligent planning and cooperation, to be recognized both nationally and internationally as a benefit to nature and mankind.

MR. BROOKS (Continued)

Align with this objective, it is my intention to allot 10 percent of any profits derived by Global within ONF toward purchase of endangered private lands and in turn donate such lands to The Sierra Club, National Audubon Society or other similarly responsible organizations for the enjoyment and benefit of all people now and in future years.

Thank you for your attention and concern in this matter.

MR. UDY: Mr. Herman E. Knight, Vice President of the Pittsburgh and Midway Coal Mining Company.

MR. HERMAN E. KNIGHT: Thank you, Mr. Udy.

The typical chronology of the long drawn out proceedings concerning possible mining in the Osceola National Forest is believed to be aptly indicated by the actual example of the Pittsburgh and Midway Coal Mining Company.

Our 15 prospecting permits were acquired by Pittsburgh and Midway in 1965. We conducted

MR. KNIGHT (Continued)

drilling campaigns during the winter of 1967 and 1968, and again during the winter of 1968 and 1969. Leases for six of the permits were applied for on April 22, 1969 and for the other nine permits, July 21, 1969.

Precise field surveys, mapping, drilling activity, chemical analytical work and computerization of the results were conducted between 1967 and 1969. The data was finally assembled in early 1969. And all of the work was supplied to the U.S. Geological Survey, immediately.

In October, 1969, the U.S.G.S. Certified as to each of our permits that, "the permittee has shown that a valuable deposit of phosphate has been discovered on the land under application during the terms of the permits," and further states, "accordingly, we recommend that preference right leases be issued to the applicant on the lands requested."

Upon request from the U.S.G.S., Pittsburgh and Midway supplied additional information in 1973, in the form of mineable tonnage and acres, MR. KNIGHT (Continued)

marginal tonnage and acres, and the number of lean acres.

An Environmental Impact Study was issued in June, 1974. Our company has waited through this long period for the leases to be granted. The Department of the Interior's Final Environmental Impact Statement states, that the location of the permits is in an environmentally fragile area, as are practically all areas in the United States and, that phosphate mining might have an adverse effect upon the area's water and wildlife. However, the statement also points out that the domestic and export demand for phosphate rock will grow, and that industry's ability to meet the demand is limited by plant capacities, the probable reserve development program, capital for new plants and equipment, and reserves available. It points out that promoting and maintaining exports of phosphate rock will contribute to the United States trade balance, and that an assured domestic supply of fertilizer that permits high and uniform agricultural usage.

MR. KNIGHT (Continued)

We agree with these above statements that, most likely, the demand for phosphate in the U.S.A. will grow. And we would like to add: Many commodities are at the mercy to substitution. Coal may be partially substituted for petroleum, plastic for zinc castings, yeast for supplements for meat or other foods, but for phosphorus, there is neither a substitute nor a replacement; since to date, no scientist has discovered any elements other than the primary nutrients: nitrogen, potash and phosphate, which the plants will accept in lieu of these basic agricultural elements.

Our company has been cooperative, diligent and patient, during the ten years in which our applications have been pending. We did the preliminary work in a manner satisfactory to the U.S.G.S. We have subsequently furnished data as requested by all government agencies.

Since this matter has been pending for these long ten years, we, again, request that our applications and requests for leases be granted.

The Final Environmental Impact Statement

MR. KNIGHT (Continued)

seriously considered protection of animal and plant life, as well as, protection of the quality of life for the people in this section of Florida. The Draft Supplement, which we are discussing here, has much repetition of material in the Final Statement, and in some cases it appears that the submittors of the Supplement data had to reach afar in order to have enough material for the Draft Supplement. We believe the Final Environmental Impact Statement was adequate, and that the leases should be issued without being further encumbered by the draft supplement.

The Final Impact Statement adequately dealt with the concern and protection of the animal life in the forest. This Final Impact Statement was believed to be adequate for the issuance of the leases. As covered above, many additions of various categories of animal life have been added in the Draft Supplement. If the Final Environmental Impact Statement allowed proper protection of the animal life, then those added in the Draft Supplement can also be protected along

MR. KNIGHT (Continued)

with the original list.

Pittsburgh and Midway is prepared to conduct its mining operations in conformances with applicable Federal and State mining law. Along with these requirements, we shall have proper concern for the animal and plant life in the Osceola National Forest, and for the people in the surrounding areas. Regarding protection of the animal life, those of you not familiar with surface mining may conclude that all animal life is obliterated in the mining area, when in reality, there is much co-existence. The coyote is a free, wary animal; we have noticed them at night within 200 feet of our draglines in southern Missouri. At another mine, south of Steamboat Springs, Colorado, at 8,000 feet elevation where it is tedious to maintain adequate plant life for the animal population, even without mining, deer at this operation come within a few hundred feet of the dragline and trucks. Elk and other animal life co-exist with the men, machinery and buildings.

The Supplement suggests areas of exclusion

MR. KNIGHT (Continued)

to be Deep Creek, Impassable Bay, Big Gum Swamp and the Red-Cockaded Woodpecker concentration area, south of Forest Service Road 278, and a 200-acre additional area for each existing and later-discovered Red-Cockaded Woodpecker colony in the potential phosphate deposit area. These comprise about 5,000 acres of the 28,000 acres of the potential phosphate deposits.

The following statement may sound facetious: but, I intend it in a very serious manner. This Supplement states that there are 30 to 60 colonies of Red-Cockaded Woodpeckers in the forest. Their existence, apparently depend on open, park-like stands of Southern Pines that include some trees infected by rot fungus that allows the woodpecker to excavate his nest. These cavity trees are at least 60 years of age. Now if the mining companies are successful in harming very few of these trees, and the colonies flourish, each new colony must have an additional 200 acres or, in this case, success could completely use up the mining areas with these allotments.

MR. KNIGHT (Continued)

We believe that the people of Florida should at least have equal standing with the Red-Cockaded Woodpecker. Florida contains 59,560 square miles -- the 1975 population had 8.4 million people. This allows 4.47 acres per person -- should each person be allowed the same amount of land as herein allocated for the Red-Cockaded Woodpecker colony, the State of Florida could support 187,000 people or 8.2 million people would be forced to leave. This is 2 million more people than were reportedly murdered by Hitler in the various ovens in Germany during World War II.

Our phosphate area contains 4,300 tons per acre. At a ceiling price of $27 per ton, the gross yield for each acre would be $116,000. Should 200 acres of phosphate area be allotted for each colony of Red-Cockaded Woodpeckers, a gross yield of 23.2 million dollars would be cancelled out. We do not intend these figures to show lack of concern for animal life in the forest, but can a country stand this kind of thinking with the national debt being 830 billion dollars? We

MR. KNIGHT (Continued)

must have concern for the sick, the old, and the needy people of America. Hospital costs in America can well average $275 per day or $100,000 per year. The gross value of phosphate lost here for each colony is equal to keeping 232 people in a hospital for 365 days. You may counter by saying, "But the money gained, would it go for this purpose?"

Assumption is sometimes made in hearings of this nature, that all the profits goes to the person digging the ores. This is not true. The payroll to the local community is a major cost, initial machinery and buildings and continuous purchase of supplies is also major. Too, it is usually conceded that one basic job creates behind it in the community another 1.8 additional jobs.

I do believe, that finally, most of the yield from a mining project is filtered into the money supply of the State and the U.S.A. You may counter again by saying, "But mining is ugly; we like to look at an undisturbed land."

I cannot argue with this with a strong heart, except, America in general would be more

MR. KNIGHT (Continued)

beautiful without railroads, railroad shops, truck terminals, cement plants, manufacturing plants of all nature, massive road cuts for our highway system, quarries, sawmills and a myriad of other non-beautiful places where men and women work. Though America would be more beautiful without these places of business, no one, so far as I know, has worked out a method for maintaining hospitals, schools, medical centers, clinics, churches, necessary government buildings, national and state parks, coastal recreation areas, tourist centers, museums, and those things that sustain life and also give it quality without also allowing some of those necessary work places, where the money is generated, to provide health giving and the beautiful things. Thank you.

MR. UDY: Thank you, Mr. Knight.

Now we have Frank Sedmera, representing the Suwannee River Coalition.

MR. FRANK SEDMERA: My name is Frank Sedmera, I'm a resident of Columbia County, and I'm speaking tonight for the Suwannee River

MR. SEDMERA (Continued)

Coalition.

The Suwannee River Coalition is an organization, a coalition, of nine state organizations and eight local organizations dedicated to the protection of the Suwannee River. Tonight we are concerned, of course, with mining in the Osceola Forest, but that has implications for the river, as well. I would like to set the tone of my remarks by referring you, gentlemen, to the beginning of our statement there which I have handed to you, and I will edit this. The Final Environmental Impact Statement seems to address most of the issues that were raised during the comment period on the Draft Environmental Impact Statement, and now the Draft Supplemental seems to represent significant improvements in the assessments of impacts, both on and off the Forest lands.

The 1973 Draft D.I.S. was quite sufficient. The Draft Statement seems to do this in a fairly straightforward and reasonably complete manner. It displays an attitude of responsiveness and concern and professional ethics on the part of

MR. SEDMERA (Continued)

a number of federal agencies that we welcome and appreciate.

The fact that we still have some constructive criticism to offer about the Impact Statements and this Draft should not be interpreted that we somehow consider ourselves as adversaries. We do not feel that way. We have adopted certain positions concerning the Draft Supplement and the Final E.I.S. And these additions are summarized on the first sheet. There are four main positions. The first one being that the Draft Supplement makes some important assumptions that we do not believe are reasonable to make. There are eight of those. These assumptions then lead, we feel, to a less than adequate assessment.

The second position is that we are convinced that bad data, if you want to use that word, was used in the section on stream water quality projections and this data than leads to an improper projection of future stream water quality on and off the Forest, especially in the River.

MR. SEDMERA (Continued)

The third position is that the Draft Statement ignores the evidence of biological damage that is severe in Swift Creek and claims, instead, for streams on and off the Forest that biological significance of elevated concentration of various chemical constituents not known. We maintain our position is that the evidence available clearly indicates that the biological systems in Swift Creek are stretched severely by chemical conditions in Swift Creek.

The fourth position is that the Draft does not consider the impact of elevated levels of radioactivity associated with mine lands, either on wildlife or on humans, either on or off the Forest. And this impact should be addressed to the extent that it can be at this time. And we understand that we are feeling our way along in this area right now.

Now, of the eight incorrect assumptions that we think have been made, three have to do with land rehabilitation leaning towards commercial revegetation of commercial forests. So three of the

MR. SEDMERA (Continued)

incorrect assumptions, we feel, deal with that. Two have to do with the level of radiation that can be expected both on and off the Forest. One has to do with what we think a very important assumption that there will be no chemical plants that will result because of this operation. Another more minor has to do with assumptions made concerning Watertown Lake and the water quality and finally the assumption that is made that if the lease application were not denied, then alternative sources would have to be developed in order to make up for this deficit that is mentioned in the document.

Now, I'm really not going to elaborate on those assumptions that we feel are not very good. The document does that that I have handed to you, but I would like to go to the second position that we stipulated here. That has to do with the basis for the water quality data that you have used in making your projections for what the stream quality will be both on and off the Forest. We understand that the data was collected from Swift

MR. SEDMERA (Continued)

Creek, from a portion of Swift Creek, during the period of two days in October of '76. This date has been referred to as being representative of discharges from normal state regulated mining beneficiation operations. Now, during that two-day period, the data apparently was collected, and we don't quarrel to the fact that the data was probably collected properly. What we do like to point your attention to is that we have tried to compare that data with the other data that is available that should be comparable with the data that was collected. And the best comparison that we can find is the literature of available is that the data presented in the Draft that we are discussing tonight compares most favorably with data for another portion of Swift Creek, draining the Swift Creek mine and beneficiation plant. The problem that we are having with accepting the data base is that the data that we were comparing to was Swift Creek and the Swift Creek mine and beneficiation was taken at a time that was more than seven months after the Swift Creek

MR. SEDMERA (Continued)

mine and beneficiation plant had been shut down, so that the water in Swift Creek has quality that is comparable of seven months or later, after the mine was shut down and the beneficiation plant was shut down, comparable to the quality that you project for an active beneficiation plant and mine. So, we feel like the data base needs to be looked at very carefully.

We would suggest to you a possible reason for why the data may look that way, and if I could have the first slide, I think perhaps the slide might help understand our reason. This is what Swift Creek looks like in August 19, 1978. This is where Swift Creek enters the Suwannee River, and this was taken during a guided tour that was being given for visitors. And it was three days prior to a public hearing on discharges of Swift Creek.

The next slide please. I realize the light is poor, but it is a more direct shot of the flow and the color released at Swift Creek on that particular weekend, and the conduct for a number

MR. SEDMERA (Continued)

of days. The third slide and the fourth slide and the fifth slide are slides of the same area. The discharges of Swift Creek into the Suwannee approximately three weeks later, and you will notice that the discharge rate had gone up significantly. The color of the creek has changed significantly, and it has scoured out the other side of the Suwannee River. The next slide was taken about two weeks later than, this was all, by the way, in the time of the drought last fall, which affected farmers rather adversely. This is the scouring that occurred in the bank of the Suwannee River during the period of drought in both the Suwannee and the area. No rain had occurred during the interval that these slides were taken.

We would suggest to you that it is possible and in fact we believe has happened that the water quality of Swift Creek can be manipulated for short periods of time, and we feel like the data probably reflects that. We really feel like we should go back and either use existing data or take some more data.

MR. SEDMERA (Continued)

Slide seven shows the division impact of the discharge from the existing mine at Hamilton County on Swift Creek. Swift Creek is the dark tannic acid creek coming in from the lower right. Effluence from the mine and chemical plant from the Occidental operations coming in from the left. And you can see that the effluence clearly dominates the creek, and there is very little mixing.

Slide eight shows you the -- well, I realize that you can't see the colors, but the color of the Swift Creek here is very, very green.

Slide nine perhaps shows that a little bit better. This is more indicative of what we feel like stream quality is likely to be as a result of mining, which includes chemical plant operations, which we feel is a very important assumption if it's overlooked.

Now, are three conditions that this chemistry, water chemistry, has indeed resulted in very severe stress to the biological communities of Swift Creek, and if you will look at the Environmental Impact Statement done for the Swift

MR. SEDMERA (Continued)

Creek chemical complex, you will find that EPA concludes that there really is no evidence for biological stress in the creek, but EPA did not follow its own guidelines in analysis of the data it represented in the documents. We did follow EPA's guidelines. In their own guidelines, analyzing the data, we also correctly used the Becke Biotic Index Equation, and when you analyze data from that point of view, you will find that there is indeed significant stress in Swift Creek. And we present evidence to show that there is a significant chemical alteration of the Suwannee River, as well.

In closing, we appreciate this opportunity to have input to the Draft Supplement. We do not believe that mining in the Forest makes sense at this time. It may make sense at some time in the future when other reserves are low and land rehabilitation techniques are proven to be actually successful.

Thank you.

MR. UDY: Thank you, Mr. Sedmera.

Now we have Mr. Gordon Aland from

MR. UDY (Continued)

Monsanto Company.

MR. GORDON ALAND: My name is Gordon Allen. I would like to submit these comments on behalf of Monsanto Company. We have 16 Phosphate Prospecting Permits issued on 1966 and '67. Shortly after they were issued or acquired, the permit areas were drilled and sampled. Analyses and the ore volume calculations were submitted. These established the presence of a valuable phosphate ore body underlying the permits areas. In April, 1968, Monsanto Company made the first application for preference right lease. In August, the U.S. Geological Survey acknowledged that a valuable deposit of phosphate ore had been discovered and recommended that a preference right lease be issued.

The remaining 15 permits were on contiguous areas and were on the same ore body and of similar quality. The preference right lease applications were filed.

About this time, the initial Osceola D.D.I. was conducted. While these studies were being conducted, the Department of Interior proposed

MR. ALAND (Continued)

and passed in May, 1976 published new requirements for qualifying for a preference right lease and notified Monsanto that they had to resubmit all 16 applications. It is Monsanto Company's position that the new regulations are not retroactive. They apply only to prospecting permits and preference right lease applications filed after the effective date of the new regulations.

However, Monsanto has voluntarily resubmitted the additional information required by the new leasing regulations, while reserving its right to protest the retroactive application of the new regulations. We have voluntarily submitted all requested information even as far as supplying information now required as we develop new formats for new information on these areas.

Monsanto Company does have a few concerns regarding the Draft Supplement to the E.I.S. There have been nearly three and a half years in research and data compilation of this study. The hearing notice was published on April 13th. I didn't receive a copy of the document until April 30th.

MR. ALAND (Continued)

This gives me about three and a half days for a review. This extremely short review period precludes anything but a cursory look at the technical data and directs my study more towards the conclusions and summaries.

It would appear that the Florida Game and Fresh Water Fish Commission has had some good luck and some bad luck. As I reviewed the updated animal population figures, the Osceola deer herd appears to have increased by 25 percent. Further study would seem to indicate that the increase in the deer herd may be due to a decrease in one of their predators, the black bear. The population revision shows a drop in the black bears by almost 50 percent. While a 50 percent decline may be very drastic to the black bears, it may be a boon to the endangered Florida panther.

To examine the panther's good fortune a little deeper, the U.S. Fish and Wildlife Service makes the recommendation that if large areas, and consequently large tonnages of ore, are withdrawn from mining, then the mining will not have an impact on several endangered species. The most

MR. ALAND (Continued)

affected species are the Bachman's Warbler, two species of woodpeckers, the Grey Bat and the Florida panther.

The panther "is a wide ranging animal that historically inhabited most of the Southeastern U.S. and -- every major habitat in Florida."

The areas designated for withdrawal from mining are swamp habitat. The reason Monsanto has very serious reservations about this withdrawal is because there have not been any verified sightings in these areas. Rather, the basis for the withdrawal is that if the panther were to inhabit the forest, he might want this area as his habitat. We feel this compounded supposition is not a very strong argument to withdraw lands.

If this logic is sound, then we have a rare opportunity to help bring back the endangered panther. Through mined lands reclamation programs, we can resculpture the surface. Through the continuing cooperation of the Forest Service, the Fish and Wildlife Service, and the mining companies, tens of thousands of acres of swamps and impassable

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MR. ALAND (Continued)

bays can be created to increase a favored habitat for the panther. With the increase in habitat and the increase in food from the growing deer population, the panther should make a comeback. Therefore, mining should be started as soon as possible to insure the perpetuation of the endangered Florida panther.

Another serious doubt Monsanto has at the present time is the new fifth alternative proposed by the Department of Interior. At first reading, the concept of two beneficiation plants on the Forest is very objectionable. It forces a mining schedule that is independent of the company's schedules and requirements. However, there may be compensating advantages. At this time, we cannot comment on this alternative, as there hasn't been enough time (and there won't be enough time by the close of the comment period) to study the legal and economic aspects of this alternative.

We definitely do not agree with the alternative to delay the decision on leasing. This is not in the spirit of the prudent man regulations

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MR. ALAND (Continued)

42 CFR Subpart 3521 published in May, 1976. A prudent man would not make the capital investment necessary to prove an economic deposit if he knew his right to lease was going to be denied until some unknown date.

It appears that the Draft Supplement has answered through research and recommendations most of the criticism in the original E.P.I.S. The additional studies with their conclusions and recommendations favor granting leases. Monsanto Company will work in cooperation with the State and Federal agencies to reclaim the areas to the mutually agreed conditions. As prudent men, we now feel that we have complied with the old and the new regulations and there have been sufficient studies and determinations to allow the Department of the Interior to issue the leases.

Thank you for this opportunity.

MR. UDY: Now we have Mr. William J. Peters, President of the Four Rivers Audubon Society.

MR. WILLIAM J. PETERS: Thank you, Mr. Udy.

MR. PETERS (Continued)

I'm Bill Peters, I'm representing Four Rivers Audubon Society, Lake City. I would like to commend the U.S.G.I. and D.L.M. on the Environmental Impact Statement, especially the improvements to is and the Final Statement in the Draft Supplement. However, we think that the Draft Supplement still does not cover everything, and I want to mention a few points that I feel have not been covered yet.

On page I-7, the chart there clearly indicates there is no need to mine in the Osceola National Forest at this time. In 1985, it's pointing out the U.S. consumption of phosphate will be about 30 million metric tons per year. Total mined phosphate they are predicting of over 60 million metric tons per year. Phosphate is a limited resource; it's non-renewable. And we have heard that rock phosphate is probably the only source.

There is another source of phosphate that people have been overlooking a great deal and this is a phosphate that we're all washing out into the ocean. We feel that this rock phosphate

MR. PETERS (Continued)

should be held as a reserve for the future of the U.S. of A. We have heard a few comments in the water effects and we have heard that the water table will probably be lowered by about five feet. People have lived in this area for some time could see effects of the lowering of water table. If you take a trip on U.S. 90 west of I-75, there used to be a lake that came almost up to the road side of I-75, Lake Lona.

Agricultural wells were placed nearby in this area and Lake Lona is now just a few shallow ponds. If this does this to Lake Lona which is probably a 10 to 15 feet deep lake or more, what will it do to Ocean Pond?

I have fished in Ocean Pond many times myself and have waded throughout most of Ocean Pond. The deepest holes in Ocean Pond are probably not much more than 10 to 18 feet. Most of the water is not more than six feet deep. A six-foot drop in water table, and you will have no Ocean Pond left.

Lake Watertown could also be affected.

MR. PETERS (Continued)

I'm not sure of the exact figuration of Lake Watertown for profile, but this is something that I don't think has been clearly covered. What effect will a drop of water table have on the areas that have been excluded from the Final Draft Supplement.

I'm speaking of Big Gum Swamp, Impassable Bay, and our natural areas. Lower water table would certainly have a drastic effect on these swamp areas. Swamps are swamps because there is water there. If you lower the water table, the swamps are going to start disappearing. With the swamps disappearing, the habitats of the animals we are talking about will start disappearing.

We have heard that it can be reclaimed, but they could not restore original conditions. We saw also in the Draft Supplement that this is one of the major sources of saw timber in the South; 60-year-old saw timber. That saw timber is produced from Longleaf Pine; primarily there is some Slash Pine in that. When you go through and mine, you are going to have a great deal of

MR. PETERS (Continued)

difficulty in restoring a forest that would last for 60 years. The pH of the soil is going to be high and pines like acid soil. The water salt, I think was addressed by the Suwannee River Coalition very adequately, so I'm not going to speak on that, but we also notice one other thing. That was in the paper in Jacksonville last Saturday in the Times-Union. There was an article in there where the National Academy of Science Panel, they said that the cancer risk due to radon gas from phosphate ore may be two to three times greater than previously realized. Therefore, we recommend there be no mining of this phosphate at this current time.

Thank you.

MR. UDY: Mr. Robert Simons.

MR. ROBERT SIMONS: My name is Bob Simons. I'm speaking for the Suwannee River Coalition. Frank Sedmera already gave a fairly conclusive statement for us, and I would like to echo what he said.

This Draft Supplement, which we are

MR. SIMONS (Continued)

supposed to talk about, is a necessary improvement. He has spoken and Mr. Peters spoke about some shortcomings. Nobody is perfect and nothing is perfect, and never will be. They have found a few shortcomings to this document, and I would like to point out three that I have found that haven't been covered.

The first was covered to some extent. The assumption is made in both the original document and the Supplement that plant flat woods habitat and some other habitats can probably be restored. I would like to read two statements in here to confirm that this is true in the Supplement on page III-4 at the top. Speaking about pine palmetto flat woods, which is the dominant forest community in the Forest. It says, "After mining, approximately one-third of the mined area would be reclaimed as lakes and ponds. This would reduce the area of vegetation left to be reclaimed, presumably as flatwoods."

On page VII-1 of the Supplement in a paragraph on vegetation. This is Irreversible

MR. SIMONS (Continued)

Irretrievable Commitment of Resources Chapter. On the righthand page of page VII-1, the second paragraph, speaking against about pine flatwoods habitat, it says, "Although these habitats would not be irreversibly lost, the older successional stages would be lost for years to come."

This is a definite statement that these habitats would not be irreversibly lost. This is in direct conflict with another part of the same chapter D on soil which is not changed in the Supplement, so I'll read it from the original Final E.I.S., Irreversible and Irretrievable Commitment of Resources, page VII-1 of the original Final E.I.S., "Surface mining would mix soil horizons into an undifferentiated mess. This change would permanently alter the existing natural soils by changing the combination of characteristics that gives each soil its productive capacity.

Soil properties of texture, structure, pH and organic matter content would be irreversibly altered. Flora and fauna that depend on native

MR. SIMONS (Continued)

soil associations would be lost or disrupted."

Pine flatwoods community are such.

"Existing soil and land form patterns that give the Forest its present characteristic landscape and vegetation pattern would be irreversibly lost."

I would agree predominantly with this original E.I.S. in what it says about the soils. I believe that is a false assumption that these areas could be restored to their original condition. They can be reclaimed, some sort of vegetation put on them, and some wildlife, but there are a lot of species that depend upon the pine flatwoods habitat that would not be able to occur on reclaimed land. So, this is one assumption I believe has cropped time and again in here which isn't really correct.

Second thing that bothers me is that the people might get the wrong impression about the number of species of plants and animals that will be effected. We have heard considerable testimony tonight about the endangered species that are listed in these documents. There are only

MR. SIMONS (Continued)

about two dozen species of animals covered in here. Most of them are threatened or endangered species and a few more that are particularly important to man such as White tailed Deer and turkey and only about one dozen plants are specifically mentioned or dealt with in these reports. This could lead people to the conclusion that these are the only species that would be seriously affected. This of course is not the case. A list of 348 animal species occurring in the Osceola is in the Supplement Appendix. There is no complete plant list in either of these documents, but it would be a considerably longer list than the animal list. This does not mean that the other perhaps 100 or so species are not important, it doesn't mean that they will not be dependent upon national forests or other Federal lands in the foreseeable future for their survival. It simply means that they weren't deemed in either immediate enough danger or important enough to somebody to study.

You can't study everything, if they studied all 1,000 species, they would just never get the job done.

MR. SIMONS (Continued)

Finally, the national forests were set up originally and perceived by most people, I think, to provide permanent reservoirs for renewal of natural resources. Both the general public and people working with endangered species and people just hoping that our wildlife would continue to survive, more or less assume that natural forests will always be here to provide habitat for all the species that have lived there.

The national forests and other similarly Federal managed lands make up a very sizable percentage of the possible permanent reservoirs for wildlife, but if this sort of mining could occur, then these forests really can't be counted on to provide specific habitats.

In summary, I think this is very important, very improbable, that any mined areas will ever be restored to biologically similar communities to those that now exist. I think this will result in permanent extermination of perhaps several hundred species of plants and animals from those areas. That doesn't mean that there won't be

MR. SIMONS (Continued)

plants and animals there, but there will be a widely adaptable sort of things, like cotton rats, cotton tailed rabbits, broom sage, things that are adaptable, but a lot of other things will be permanently exterminated. I think this single purpose of highly destructive use of a national forest flies in its face as the purpose of national forests.

MR. UDY: Now we have Ms. Helen Wood representing Florida Defenders of the Environment.

MS. HELEN HOOD: I'm representing Florida Defenders of the Environment. My name is Helen Hood, not Wood.

Florida Defenders of the Environment endorses the statement presented by our members, J. Frank Sedmera and R. W. Simons for the Suwannee River Coalition. I would like to the hearing record some general remarks for FDE, and submit a more detailed statement in writing later.

Our organization consists or various environmental specialists who volunteer their time and their expertise to the defense of Florida's

MS. HOOD (Continued)

fragile environment. We will be submitting some more detailed statements written by various of our members.

Although the Final E.I.S. and the Draft Supplement provide a great deal of technical information, they leave many questions unanswered, particularly with regard to legal precedents, calculations of economic benefits, reclamation vs. restoration, and the need to mine phosphate on public land at this time. Legal and economic questions will be addressed in the written statement, but I would like to discuss reclamation and need briefly.

The Draft Supplement itself poses an leaves unanswered serious questions about reclamation. The analysis of the possibility for re-establishing sawtimber production states that there is a good possibility that sawtimber production could be re-established. However, this conclusion is based only on opinions of various professionals, with no scientific data to support those opinions. Not only has no research on this problem been done, but the examples of

MS. HOOD (Continued)

re-establishment of vegetation that are shown to support the opinions were on lands in Central Florida that were mined by different techniques 60 to 70 years ago.

I commend the authors of the Draft Supplement for stating that:

"The present primitive state-of-the-art of phosphate mine reclamation precludes the evaluation of the potential impact of future mining and reclamation on the Osceola by merely extrapolating present technology to future conditions. Research is needed to restore the "natural" systems of the Osceola."

This statement introduces another important question. Can strip mining be justified as being in the public interest if the best that can be said about reclamation is that there is a good possibility that sawtimber production can be re-established? FDE believes that the multiple use of these public lands must be possible before mining can be allowed. In other words, it must be scientifically demonstrated that restoration is

MS. HOOD (Continued)

possible, or mining is not in the public interest.

The most serious question that FDE finds unanswered is the need to mine phosphate on public lands in Florida. In the Final E.I.S., Jack E. Ravan, Regional Administrator of EPA raised the question and made an excellent recommendation:

"Furthermore, it appears that the 120 million tons of phosphate rock under Osceola Forest represent only about 10 percent of the total Florida reserves.

An acceptable policy in the national interest would be to establish this 120-million-ton unit as a strategic reserve in order to insure an emergency domestic supply. We strongly recommend that these phosphate deposits within Osceola Forest being considered for mining be kept in reserve, and that they be developed only at such time that no other alternatives are available."

I could find no reference to the latest evaluation of phosphate deposits in Florida which indicates that identified reserves are 4 billion

MS. HOOD (Continued)

tons rather than the 1.2 billion figure in 1974. The report also lists -- I have given references to all of the reports in the written statement, but I won't read them out. The report also lists five other sources of additional reserves of undetermined extent. Therefore, the phosphate under the Osceola Forest cannot be considered a critical supply needed for export.

Strip mining in any national forest would violate the intent of the Weeks Act of 1911 which authorized the purchase of the Osceola. It would violate the policy of multiple use management of the Forest as public land. The Final E.I.S. and Draft Supplement do not address the economic benefits or costs of mining, nor do they support the issuance of the leases as being in the public interest. The state and federal agencies concerned with environmental protection oppose the leases. Therefore, Florida Defenders of the Environment is opposed to the issuance of mining leases in the Osceola National Forest.

Thank you.

MR. UDY: Now we have Julian Elgin from the Alabama Farm Bureau Association.

MR. JULIAN ELGIN: My name is Julian Elgin, I'm Chairman of the Alabama Farm Bureau Forest and Natural Resource Committee which follows interests of mine which the program involves.

I'm a lifetime farmer in Montgomery, Alabama. It has been my privilege in the past and the years past in the late 50's to participate and originate the National Farm Eradication Program that started at that time. This was a highly effective program and the reason I mention that program is because, at that time, we were faced with scare tactics that originated with the Audubon Society. We even put on test demonstrations in the use of these chemicals, at that time, to prove that they were not dangerous if used effectively and used correctly. And even those results were used as scare tactics, even though the farmers that were scared, at the time, the first year; the second year were begging for this program.

So, I don't believe in these scare tactics. I think we ought to deal in facts and let

MR. ELGIN (Continued)

the programs and the interests of the people of America stand for itself. I was interested in a farm program in the late 50's where I saw the government program decimate the small farmers of this country, and force them off the farms, a government program. Those farmers later spawned the children that rioted and burned the cities in the 60's. So, I'm not too impressed with government programs as such.

I'm more impressed with free enterprise and the opportunity to do the job that America needs done. I don't have any details on this program as to the personalities of the companies or what-not involved, but as a farmer, I know that we in the Black Belt need phosphate, and plenty of it. It is a critical element in the production of our crops in our area. Our Black Belt soil needs heavy application of phosphate. We depend on it. The American people depend on it, and if we can't get it, we certainly can't produce the food and fiber that this nation needs, and is going to have, and is even those in the

MR. ELGIN (Continued)

Audubon Society and others.

I have no quarrel with those individuals in those societies. They have here admitted that this is going to be mined sometime, but not now. I don't know what they've got against this generation; what's wrong with us? We probably see what's wrong with me standing up here, but what's wrong with everybody else that we don't lend some common sense to these things and do what should be done for the best interest of the country?

As a farmer, I'm one who lives in and with the environment there of these things you are speaking of. They mention the deer and the turkey and the bear and what-not that will be jeopardized. In their program that they put on back then, they told the same story that we are going to ruin the turkey and the deer and the quail. Actually, it was beneficial to all of these. That's generally conceded at this time.

So, these scare tactics don't scare me. And I hope they don't scare anybody else, but we have vast ecological problems in this country, and I hope we don't turn them over to any half-working

MR. ELGIN (Continued)

bureaucracy to solve.

The same bears that they speak of that will be destroyed by the mining or whatever down here, they are flourishing on the garbage of civilization in Canada and Alaska and what-not. You have probably seen the pictures of where these bears are scattered in the garbage dumps up there. So, even the garbage from civilization is better for the ecology in a lot of places than the plans of bureaucracy. It's something to think about when you have got to get out there and farm, and we live in the area that you are speaking of that is affected by ecology; you got people down here that are living in it.

We are interested in clean water, farmers themselves are interested in clean water and the clean environment. We want it to be that way and we don't suggest anything in this instance that would be otherwise, but we only hope that we can continue to get the goods that we need to farm with to produce what is needed for this country on an economic basis that will make us competitive in

MR. ELGIN (Continued)

the world and make us appreciated in this country.

We appreciate the opportunity to appear here in Florida with this group and express this opinion which I express of as my own as a farmer, lifetime farmer, and I hope to be able to remain one. I have no other calling, but I would like for others coming on, even those that were forced off the farms in the 60's, and even now, today, being forced off the farms by various programs. It's certainly not to the advantage of this nation to handicap agriculture by not doing things that are practical and make common sense.

And I hope, Mr. Chairman, that this 10-minute limitation you have imposed doesn't imply that there is a pre-conceived end or pre-conceived result as far as mining this forest land. I don't speak of this forest land -- we are savoring the multi-purpose use of forest land throughout America for the best interest of all America, that is the basic interest that we have. We don't feel like it will hurt anything or have any permanence. We feel like it's basically the people of America must and should get the best interests and the best

MR. ELGIN (Continued)

available use of these forest lands. And the only way to do that instead of providing this land and setting aside these lands for the use of a few, and usually it's the wealthy, to set aside for their use and preserve it for some purpose like that without using it to the best advantage of all Americans is just not in the spirit of the American way.

Again, I think you, Mr. Chairman. I will be excused with two fingers.

MR. UDY: Thank you, sir.

Now we have Mac Reigger, representing the Northeast Florida Regional Planning Council.

MR. MAC REIGGER: Thank you, sir.

I won't take ten minutes.

A letter was sent to you on the 7th of this month that expressed the concerns that the Northeast Florida Regional Planning Council, a volunteer association of local governments that represent the seven counties in Northeast Florida including Baker, Duval, Clay, Nassau, Putnam and St. John's Counties, have about this project or this

MR. ~~ELGIN~~ Reiggar (Continued)

proposal. I will submit this to you later. The key aspect of their concerns relate to the impact on portable -- potable water supplies, loss of valuable timber resources, and loss of valuable wildlife and recreational resources.

I would like to point out one oversight in your Supplement on page I-9. It states that there is no change in the state multi-county planning district alignment. The Northeast Florida Regional Planning Council was formed in February of 1977, and I assume this is why we were not transmitted a copy of the E.I.S. to review. The letter to you, Mr. Udy, relates our need for a number of copies to distribute to those elected officials who represent the people that will most likely be affected by this project. We are speaking negatively or positively at this time. We would just like the opportunity to review this, and I have spoken to the representative of the Bureau of Land Management, and he has assured me that we will receive our copy. And they are heartened by the fact that you have extended your time for review until June 12, which will allow

MR. ~~ELGIN~~ Reiggar (Continued)

our Council to act or pass their comments along to you. after their regularly scheduled meeting in June.

Thank you.

MR. UDY: We now have Dr. Archie Carr, III from the Florida Audubon Society.

DR. ARCHIE CARR, III: I'm Archie Carr, Special Assistant to the President for Science of the Florida Audubon Society located, our headquarters are located, in Maitland, Florida. I have a Ph.D. in the field of ecology and I have worked the better part of two years for the Society in issues relating to phosphate, the environmental impact of phosphate mining in Florida.

Florida Audubon Society is also a founding member of the Suwannee River Coalition. Indeed, protection of the Suwannee River is one of the great goals of the people of this state, and my colleagues have spoken on the major issues of concern with the Supplement; and I will try to be brief, accordingly.

I also have recently participated in a

DR. CARR (Continued)

very challenging endeavor as a member of the Coastal Plains Phosphate Panel of the Committee on Surface Mining and Reclamation, which is a committee of the National Research Institute, the functional arm of the National Academy of Sciences.

What we did on that committee was review Florida phosphate mining, to look for ways to determine the impacts and determine current mitigation practices and potentialities in terms of law and state, federal regulations, and to recommend to Congress, means of improving, more adequately serving the needs of phosphate mining, and particularly reclamation of phosphate mining. And I mention these things to establish a little bit of credibility with the phosphate enterprise. I work with my boss, the President of Florida Audubon, Howell Scott, who sits on the Board of Florida Phosphate Research Institute. Two other members of the Board are here tonight. I work closely with Mr. Scott on subjects of concern to Research Institute. This was an organization as spawned by the State Legislature last year to look

DR. CARR (Continued)

into the critical problems of phosphate mining reclamation and phosphate production, as well.

Interestingly and relevant to tonight's testimony, among the top priorities listed not only by Audubon Society and the University of Florida, but by the Florida Phosphate Council to evaluate methods of reclamation, find out what works on reclaimed mine lands. How to do it. Also this was written into the law to find ways to cope with slimes, that is clay wastes.

The subject was discussed in some degree in the Supplement.

These are areas that we consider, in fact the Florida community has fairly agreed to the point that they are unknowns. We have no definite answers to which way to go. That seems to me to be of importance to the Secretary of Interior as he contemplates whether or not to grant permits on the Osceola or whether or not there is indeed a valuable resource there. There is a sort of cruel irony here that I sense upon arriving in Lake City at this hearing. I speak

DR. CARR (Continued)

for about 35,000 members of the Florida Audubon Society, and we and other members of the public and especially in Central Florida, where, since the turn of the century, but since, particularly, since World War II, this industry has operated rather intensively.

We agonize in these areas over questions of surface water quality, over the consumption of ground water, over the loss of vegetative cover of such land; tens of thousands of acres. We are concerned with the extermination of species from areas, and wonder what species will come back and what real values we have lost in terms of weaknesses and balances in the area where we live. Our members also profit, I'm sure, from the fact that phosphate industry is there.

So, we don't deny the benefits of the phosphate industry. We don't deny the need for these phosphates, but we have the concerns out in the rest of Florida. We agonize, we go through the detail that you have here in the Supplement in the E.I.S. document. We go into that kind of

DR. CARR (Continued)

detail over just the run of the mill Florida land. Now, we are going to propose to mine a national forest?

Essentially, to you, to the most of Floridians I have talked to, it is a preposterous suggestion that verges on madness to think of mining a national forest. It's not like it's just another piece of Florida. It's an exceptional piece of Florida, administratively and to a great degree ecologically with regard to the fact that we have identified wilderness areas there where this wilderness designation under the rare to process. There are a lot of exceptions by high valued land in terms of general logical merit and there is tremendous amounts of valuable land in terms of timber production, as well.

Is it sane, is it silly of us to have these emotions about it? It is indeed an emotional issue. In fact, we are in a political milieu where emotions happen to count in terms of who gets elected and who gets unelected. But beyond that, quoting here from the Federal Environmental

DR. CARR (Continued)

Law Large Document, a treatise on federal environmental law by the Environmental Law Institute. Citing some segments from various acts relating to the Forest Service, Forest Service Management. A couple of sentences here: The Forest Service Organic Administration Act of 1897 provided that the principal reasons for the establishment of the national forests were "to improve and protect the forest for the purpose of securing favorable conditions for water flowing, furnish continuous supplies of timber for the use and necessities of the citizens of the Unites States."

In 1897, they determined a national forest was to produce timber. Later, a 1960 Congress Multiple Use and Sustained Yield Act of 1960 declared that national forests "shall be administered for outdoor recreation, timber, watershed, and wildlife and fish purposes under the principles of Multiple Use and Sustained Yield."

This is what is spoken to, the idea of multiple use.

DR. CARR (Continued)

Now, this is not something we dreamed up out here in Lake City or down in Orange County. That is what it says in federal law. We have grown to respect national forests to grow trees on it, and little birds fly around in the trees, and the little deer walk though the trees. We didn't grow up expecting a national forest to be dug up, to be plowed 40 feet and mixed into soil upon which very little grows.

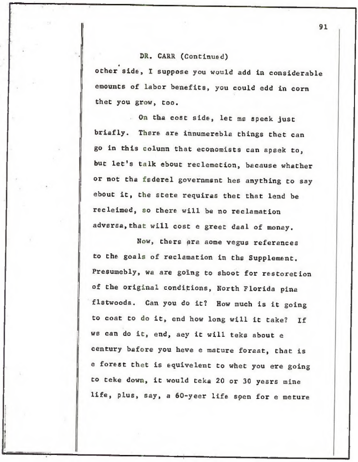
So, indeed we feel that we have some grounds to rest our emotions upon. It takes one by surprise to contemplate the idea of mining a national forest.

Now, you can also speak to it in very specific ecological terms. I would like to make a recommendation here on the Supplement. The essence of the debate that is going on here of the procedure that we are all involved in will all be focused, I'm barring other kinds of unpredictable event upon the Secretary of the Interior's decision on whether or not a valuable deposit exists.

DR. CARR (Continued)

I would like to see if it would be possible in the Final Draft of your Supplement if you could add a little chart in which you look at values. These might be the criteria that the Secretary will use. A kind of a cost benefit ratio. On the benefit side, put the phosphate rock there. You try to get as close as you can an accurate determination of how much phosphate is there. That is very often very difficult to obtain because accurate portrayals of what resource is under what leaf will give a competitor's secrets away for the composition.

Try to get a good accurate fix on how much phosphate is there. How much is under the rare to land, subtract that, because we are not going to mine the rare to wilderness area, not without another lawsuit. Subtract those areas that Forest Service and other relevant agencies said are absolutely out of the question; perhaps the Red-Cockaded Woodpecker's habitat. And then see what you have remaining in the way of tons of phosphate, and evaluate its worth. On the

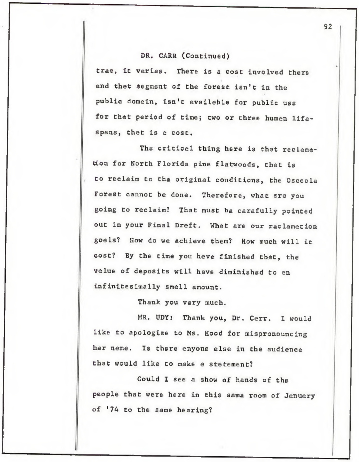


DR. CARR (Continued)

other side, I suppose you would add in considerable amounts of labor benefits, you could add in corn that you grow, too.

On the cost side, let me speak just briefly. There are innumerable things that can go in this column that economists can speak to, but let's talk about reclamation, because whether or not the federal government has anything to say about it, the state requires that that land be reclaimed, so there will be no reclamation adverse, that will cost a great deal of money.

Now, there are some vague references to the goals of reclamation in the Supplement. Presumably, we are going to shoot for restoration of the original conditions, North Florida pine flatwoods. Can you do it? How much is it going to cost to do it, and how long will it take? If we can do it, and, say it will take about a century before you have a mature forest, that is a forest that is equivalent to what you are going to take down, it would take 20 or 30 years mine life, plus, say, a 60-year life span for a mature



DR. CARR (Continued)

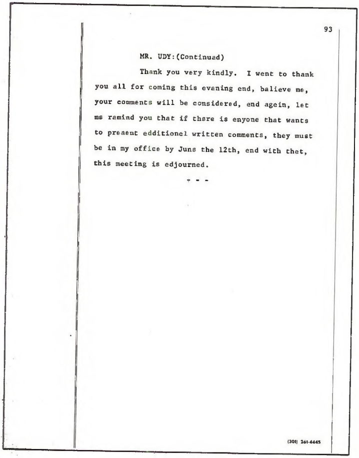
tree, it varies. There is a cost involved there and that segment of the forest isn't in the public domain, isn't available for public use for that period of time; two or three human life-spans, that is a cost.

The critical thing here is that reclamation for North Florida pine flatwoods, that is to reclaim to the original conditions, the Osceola Forest cannot be done. Therefore, what are you going to reclaim? That must be carefully pointed out in your Final Draft. What are our reclamation goals? How do we achieve them? How much will it cost? By the time you have finished that, the value of deposits will have diminished to an infinitesimally small amount.

Thank you very much.

MR. UDY: Thank you, Dr. Carr. I would like to apologize to Ms. Hood for mispronouncing her name. Is there anyone else in the audience that would like to make a statement?

Could I see a show of hands of the people that were here in this same room of January of '74 to the same hearing?



MR. UDY: (Continued)

Thank you very kindly. I want to thank you all for coming this evening and, believe me, your comments will be considered, and again, let me remind you that if there is anyone that wants to present additional written comments, they must be in my office by June the 12th, and with that, this meeting is adjourned.

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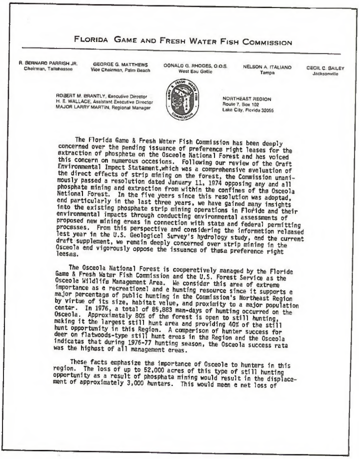

FLORIDA GAME AND FRESH WATER FISH COMMISSION

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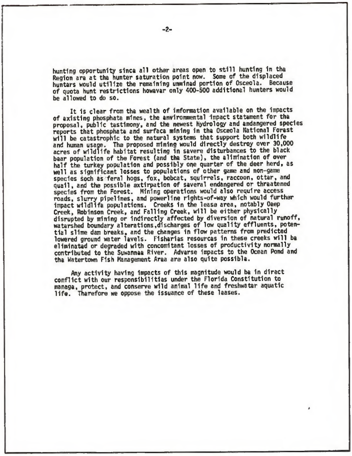
MAJOR LARRY MARTIN, Regional Manager

NORTHEAST REGION
Route 7, Box 102
Lake City, Florida 32055

The Florida Game & Fresh Water Fish Commission has been deeply concerned over the pending issuance of preference right leases for the extraction of phosphate on the Osceola National Forest and has voiced this concern on numerous occasions. Following our review of the Draft Environmental Impact Statement,which was a comprehensive evaluation of the direct effects of strip mining on the forest, the Commission unanimously passed a resolution dated January 11, 1974 opposing any and all phosphate mining and extraction from within the confines of the Osceola National Forest. In the five years since this resolution was adopted, and particularly in the last three years, we have gained many insights into the existing phosphate strip mining operations in Florida and their environmental impacts through conducting environmental assessments of proposed new mining areas in connection with state and federal permitting processes. From this perspective and considering the information released last year in the U.S. Geological Survey's hydrology study, and the current draft supplement, we remain deeply concerned over strip mining in the Osceola and vigorously oppose the issuance of these preference right leases.

The Osceola National Forest is cooperatively managed by the Florida Game & Fresh Water Fish Commission and the U.S. Forest Service as the Osceola Wildlife Management Area. We consider this area of extreme importance as a recreational and a hunting resource since it supports a major percentage of public hunting in the Commission's Northeast Region by virtue of its size, habitat value, and proximity to a major population center. In 1976, a total of 85,883 man-days of hunting occurred on the Osceola. Approximately 80% of the forest is open to still hunting, making it the largest still hunt area and providing 40% of the still hunt opportunity in this Region. A comparison of hunter success for deer on flatwoods-type still hunt areas in the Region and the Osceola indicates that during 1976-77 hunting season, the Osceola success rate was the highest of all management areas.

These facts emphasize the importance of Osceola to hunters in this region. The loss of up to 52,000 acres of this type of still hunting opportunity as a result of phosphate mining would result in the displacement of approximately 3,000 hunters. This would mean a net loss of



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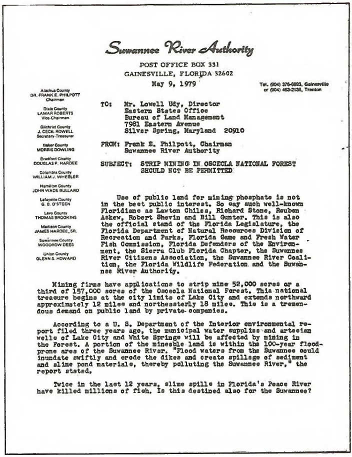
hunting opportunity since all other areas open to still hunting in the Region are at the hunter saturation point now. Some of the displaced hunters would utilize the remaining unmined portion of Osceola. Because of quota hunt restrictions however only 400-500 additional hunters would be allowed to do so.

It is clear from the wealth of information available on the impacts of existing phosphate mines, the environmental impact statement for the proposal, public testimony, and the newest hydrology and endangered species reports that phosphate and surface mining in the Osceola National Forest will be catastrophic to the natural systems that support both wildlife and human usage. The proposed mining would directly destroy over 30,000 acres of wildlife habitat resulting in severe disturbances to the black bear population of the Forest (and the State), the elimination of over half the turkey population and possibly one quarter of the deer herd, as well as significant losses to populations of other game and non-game species such as feral hogs, fox, bobcat, squirrels, raccoon, otter, and quail, and the possible extirpation of several endangered or threatened species from the Forest. Mining operations would also require access roads, slurry pipelines, and powerline rights-of-way which would further impact wildlife populations. Creeks in the lease area, notably Deep Creek, Robinson Creek, and Falling Creek, will be either physically disrupted by mining or indirectly affected by diversion of natural runoff, watershed boundary alterations,discharges of low quality effluents, potential slime dam breaks, and the changes in flow patterns from predicted lowered ground water levels. Fisheries resources in these creeks will be eliminated or degraded with concomitant losses of productivity normally contributed to the Suwannee River. Adverse impacts to the Ocean Pond and the Watertown Fish Management Area are also quite possible.

Any activity having impacts of this magnitude would be in direct conflict with our responsibilities under the Florida Constitution to manage, protect, and conserve wild animal life and freshwater aquatic life. Therefore we oppose the issuance of these leases.



Suwannee River Authority

POST OFFICE BOX 331
GAINESVILLE, FLORIDA 32602

Tel. (904) 376-6893, Gainesville
or (904) 463-2136, Trenton

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Suwannee County
WOODROW DEES

Union County
GLENN S. HOWARD

May 9, 1979

TO: Mr. Lowell Udy, Director
Eastern States Office
Bureau of Land Management
7981 Eastern Avenue
Silver Spring, Maryland 20910

FROM: Frank E. Philpott, Chairman
Suwannee River Authority

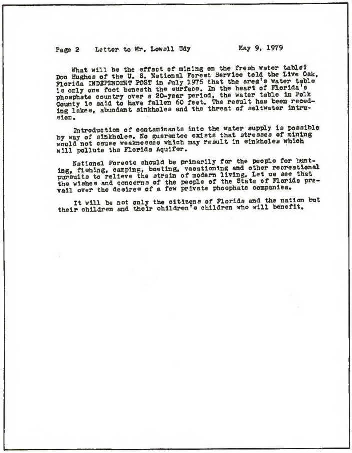
SUBJECT: STRIP MINING IN OSCEOLA NATIONAL FOREST SHOULD NOT BE PERMITTED

Use of public land for mining phosphate is not in the best public interest. So say such well-known Floridians as Lawton Chiles, Richard Stone, Reuben Askew, Robert Shevin and Bill Gunter. This is also the official stand of the Florida Legislature, the Florida Department of Natural Resources Division of Recreation and Parks, Florida Game and Fresh Water Fish Commission, Florida Defenders of the Environment, the Sierra Club Florida Chapter, the Suwannee River Citizens Association, the Suwannee River Coalition, the Florida Wildlife Federation and the Suwannee River Authority.

Mining firms have applications to strip mine 52,000 acres or a third of 157,000 acres of the Osceola National Forest. This national treasure begins at the city limits of Lake City and extends northward approximately 12 miles and northeasterly 18 miles. This is a tremendous demand on public land by private companies.

According to a U. S. Department of the Interior environmental report filed three years ago, the municipal water supplies and artesian wells of Lake City and White Springs will be affected by mining in the Forest. A portion of the mineable land is within the 100-year flood-prone area of the Suwannee River. "Flood waters from the Suwannee could inundate swiftly and erode the dikes and create spillage of sediment and slime pond materials, thereby polluting the Suwannee River," the report stated.

Twice in the last 12 years, slime spills in Florida's Peace River have killed millions of fish. Is this destined also for the Suwannee?

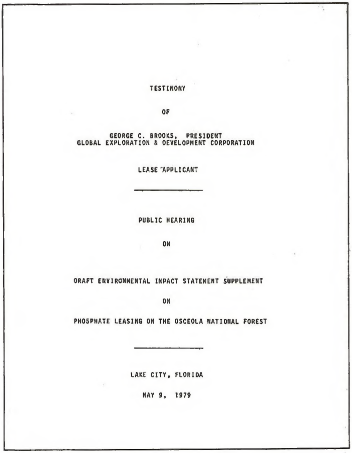


What will be the effect of mining on the fresh water table? Don Hughes of the U. S. National Forest Service told the Live Oak, Florida INDEPENDENT POST in July 1976 that the area's water table is only one foot beneath the surface. In the heart of Florida's phosphate country over a 20-year period, the water table in Polk County is said to have fallen 60 feet. The result has been receding lakes, abundant sinkholes and the threat of saltwater intrusion.

Introduction of contaminants into the water supply is possible by way of sinkholes. No guarantee exists that stresses of mining would not cause weaknesses which may result in sinkholes which will pollute the Florida Aquifer.

National Forests should be primarily for the people for hunting, fishing, camping, boating, vacationing and other recreational pursuits to relieve the strain of modern living. Let us see that the wishes and concerns of the people of the State of Florida prevail over the desires of a few private phosphate companies.

It will be not only the citizens of Florida and the nation but their children and their children's children who will benefit.



TESTIMONY

OF

GEORGE C. BROOKS, PRESIDENT
GLOBAL EXPLORATION & DEVELOPMENT CORPORATION

LEASE APPLICANT

PUBLIC HEARING

ON

DRAFT ENVIRONMENTAL IMPACT STATEMENT SUPPLEMENT

ON

PHOSPHATE LEASING ON THE OSCEOLA NATIONAL FOREST

LAKE CITY, FLORIDA

MAY 9, 1979

My name is George C. Brooks. My address is 1414 Collins Lane, Lakeland, Florida 33803. I am President and Founder of Global Exploration and Development Corporation, one of the lease applicants in the Osceola National Forest.

For the past 30 years I have held responsible positions in the development and production of coal and phosphate rock, energy and food related materials, for the benefit of mankind. I am proud of this necessary and worthwhile contribution to society. I am equally proud to be a supporting member of the Sierra Club and member of the National Audubon Society supporting aims and purposes under which these organizations were founded.

In 1963, as Director of Mining & Exploration I guided a small California oil company with $5,000,000 annual sales to a phosphate deposit on the western half of the orebody under discussion. This effort has resulted in substantial economic benefit to North Florida.

Leaving this company in 1965, I formed my present company with high hopes under the spirit of American free enterprise.

Shortly, thereafter Global entered into agreement with Bureau of Land Management, with good faith and intent in purpose by investing my life's savings in the form of annual rental payments to BLM for approximately 20,000 acres within ONF under exploration permits as provided by existing law. This was and is a good law in that it provides the orderly development of our nation's resources by private and free enterprise with opportunity afforded small companies along with large corporations.

Incidentally, the Federal Government acquired the approximate 157,000 acres within ONF boundaries from private owners for $5.04 per acre. From the inception of permitting all companies acting in good faith, under the law, will have expended upward to this amount in rental, drilling, overhead costs along with litigation and investigative costs in acquiring rights already established by law.

Since 1969 or a decade since the first leases were applied for and certification of valuable deposits discovered were made by USGS the scenario in the ONF has been one of orchestrated delay on lease issuance supported by conjecture, supposition and outright misrepresentation of happenings if surface extraction of the valuable phosphates would occur.

For example, a former elected Florida official stated, according to a news release, quote "permission to mine phosphate in the Osceola National Forest in Northeast Florida would ruin the recreational area for generations", unquote.

FACT: Based on concurrent surface extraction of minerals, from a minimum of two sites, activity would temporarily disturb approximately less than one-half of 1 per cent of the total area or 1,000 acres annually. By comparision, the U.S. Forest Service clear cuts over twice this amount or 2,000 acres annually. For this, a question is posed which should be self answering with some common-sense reflection. What happens to the wildlife over this 2,000 acre area or 3.13 square mile area clear cut each year? The obvious answer would be, they migrate. Any good miner or forester would take appropriate action in protection of any actual active nest in such an area. From a recreation standpoint, it is perceived that in any given 5 year period from 5 to 7,000 acres would be involved leaving over 150,000 acres for present recreational and timbering use. Reforestation would take place on the 5 to 7,000 acres with fresh water lakes created during reclamation providing fishing, swimming and boating for centuries to come. In addition, habitat would be improved for certain species according to a comprehensive report by U.S. Fish and Wildlife Services concerning phosphate activity in ONF.

Another example, a U.S. Senator stated on January 17, 1974 and I quote, "The lease price is ridiculous. They're talking in terms of $121,000 for the entire forest.

FACT: Based on production rate of 4,000,000 tons per year emanating from a minimum of two mine sites and assuming the present royalty of 5 per cent applied to a conservative average market value of $30.00 per ton between 1985 and 2,005, six million dollars per year would be taken in by the Federal Government. In turn, the Federal Government would, as provided by law, return 37½ per cent of these monies or $2,250,000 annually back into the treasury of Columbia or Baker counties for public roads and education. In addition, another 10 per cent or $600,000 annually would return earmarked for construction and maintenance of National Forest roads and trails. This information has been withheld from the people of Columbia and Baker counties by elected official for reasons known only to them. Employment and benefits derived from this source alone could approach $60,000,000 for the 1985-2005 period. Elected officials of any Florida county should welcome this windfall for their people.

Still another example, are statements made by elected state and federal officials and employees attempting to discredit dedicated scientists from U.S.G.S. and U.S. Fish and Wildlife in their report which substantiate facts those of us experienced in the business already knew, vis-a-vis; the draw down on the aquifer would be 5 feet or less and long term disturbance on less than 18 per cent of the total forest area would be minimal. Actually, many benefits will be derived in the areas of future pine production, wildlife habitat, water management and recreation provided cooperation is achieved between the operators, U.S. Forest Service, U. S. Fish and Wildlife and other interested and responsible environmental groups.

These are but a few of the totally inaccurate statements and contentions made over the past decade, spanning three administrations, regarding surface extraction of phosphate minerals within the Osceola National Forest.

Based on recent articles appearing in the media and impressions from others regarding conversations with government officials it appears attempts are being made to circumvent our rights by arbitrary deletion of lands from various lease application blocks, thus attempting to create a non-economic mining condition for the companies.

Recognizing the commercial value of our phosphate and in view of the level of activity conducted on the western portion of the orebody since 1966 I vigorously oppose any attempt by the responsible agencies and officials thereof to use whim and arbitrary means to circumvent our rights in attempts to infer and adjudge our deposits are not valuable for

commercial development. We intend to utilize every appropriate and legal means to protect our interest in this matter.

Few, if any, in this hearing, can perceive the mental and physical anguish these repeated, unwarranted delays have wrought on this witness. Further, such callous delay will bankrupt a small company. If those responsible are successful by whatever means in circumventing the written law by withholding our rights in the Osceola National Forest, without just and equitable compensation, than our Department of Interior has reached a low point in history since founding in 1849. There is much discussion today of human rights and who can disagree, here is one small American businessman subjected to one of the most cavalier disregard of rights in our nation's history.

All of the present lease applicants have demonstrated responsible attitudes toward the environmental infrastructure, insofar as possible, in their mining operations. Pittsburgh and Midway Coal Company demonstrated sound reclamation practices even before mandatory reclamation laws existed. My own production and environmental record is second to none in the Florida phosphate industry.

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All of the present lease applicants have demonstrated responsible attitudes toward the environmental infrastructure, insofar as possible, in their mining operations. Pittsburgh and Midway Coal Company demonstrated sound reclamation practices even before mandatory reclamation laws existed. My own production and environmental record is second to none in the Florida phosphate industry.

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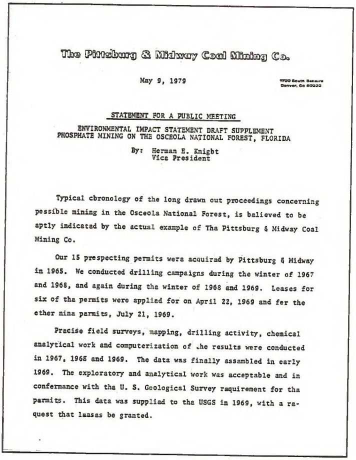
Now then, in view of the fact the Osceola will be mined at some point in time, will the responsible environmental community continue in the attempt to block these responsible lease applicants only to have a company mine in the future with perhaps a record of falsifying reports or involvement in other detrimental practices, environmentally speaking?

I challenge all agencies and officials to move forward in a positive and responsible manner with us to achieve great economic benefit for the state and community and create a landmark project, through intelligent planning and cooperation, to be recognized both nationally and internationally as a benefit to nature and mankind.

Align with this objective, it is my intention to allot 10 per cent of any profits derived by Global within ONF toward purchase of endangered private lands and in turn donate such lands to The Sierra Club, National Audubon Society or other similarly responsible organizations for the enjoyment and benefit of all people now and in future years.

Thank you for the attention and concern in this matter.



The Pittsburg & Midway Coal Mining Co.

7720 South Bellaire
Denver, Co 80222

May 9, 1979

STATEMENT FOR A PUBLIC MEETING

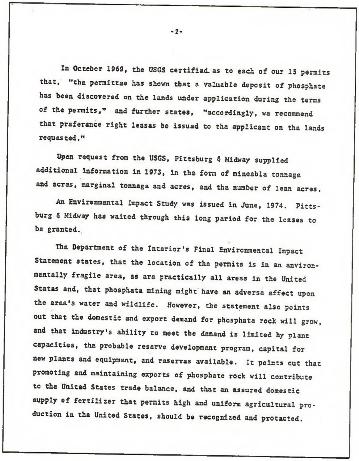
ENVIRONMENTAL IMPACT STATEMENT DRAFT SUPPLEMENT PHOSPHATE MINING ON THE OSCEOLA NATIONAL FOREST, FLORIDA

By: Herman E. Knight
Vice President

Typical chronology of the long drawn out proceedings concerning possible mining in the Osceola National Forest, is believed to be aptly indicated by the actual example of The Pittsburg & Midway Coal Mining Co.

Our 15 prospecting permits were acquired by Pittsburg & Midway in 1965. We conducted drilling campaigns during the winter of 1967 and 1968, and again during the winter of 1968 and 1969. Leases for six of the permits were applied for on April 22, 1969 and for the other nine permits, July 21, 1969.

Precise field surveys, mapping, drilling activity, chemical analytical work and computerization of the results were conducted in 1967, 1968 and 1969. The data was finally assembled in early 1969. The exploratory and analytical work was acceptable and in conformance with the U. S. Geological Survey requirement for the permits. This data was supplied to the USGS in 1969, with a request that leases be granted.



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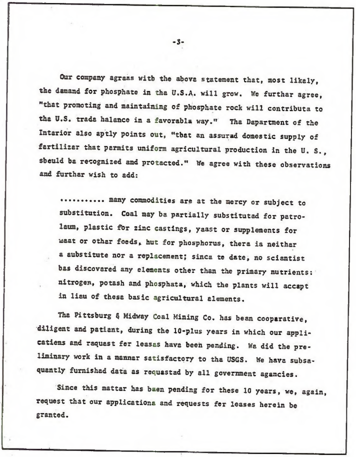
In October 1969, the USGS certified as to each of our 15 permits that, "the permittee has shown that a valuable deposit of phosphate has been discovered on the lands under application during the terms of the permits," and further states, "accordingly, we recommend that preference right leases be issued to the applicant on the lands requested."

Upon request from the USGS, Pittsburg & Midway supplied additional information in 1973, in the form of mineable tonnage and acres, marginal tonnage and acres, and the number of lean acres.

An Environmental Impact Study was issued in June, 1974. Pittsburg & Midway has waited through this long period for the leases to be granted.

The Department of the Interior's Final Environmental Impact Statement states, that the location of the permits is in an environmentally fragile area, as are practically all areas in the United States and, that phosphate mining might have an adverse affect upon the area's water and wildlife. However, the statement also points out that the domestic and export demand for phosphate rock will grow, and that industry's ability to meet the demand is limited by plant capacities, the probable reserve development program, capital for new plants and equipment, and reserves available. It points out that promoting and maintaining exports of phosphate rock will contribute to the United States trade balance, and that an assured domestic supply of fertilizer that permits high and uniform agricultural production in the United States, should be recognized and protected.



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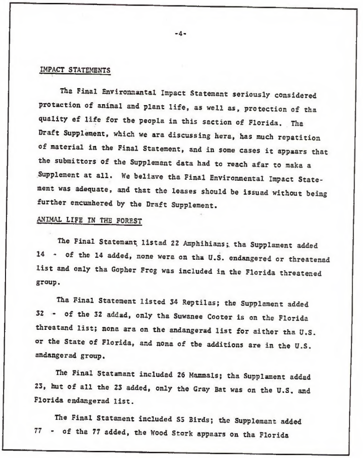
Our company agrees with the above statement that, most likely, the demand for phosphate in the U.S.A. will grow. We further agree, "that promoting and maintaining of phosphate rock will contribute to the U.S. trade balance in a favorable way." The Department of the Interior also aptly points out, "that an assured domestic supply of fertilizer that permits uniform agricultural production in the U. S., should be recognized and protected." We agree with these observations and further wish to add:

> .... many commodities are at the mercy or subject to substitution. Coal may be partially substituted for petroleum, plastic for zinc castings, yeast or supplements for meat or other foods, but for phosphorus, there is neither a substitute nor a replacement; since to date, no scientist has discovered any elements other than the primary nutrients: nitrogen, potash and phosphate, which the plants will accept in lieu of these basic agricultural elements.

The Pittsburg & Midway Coal Mining Co. has been cooperative, diligent and patient, during the 10-plus years in which our applications and request for leases have been pending. We did the preliminary work in a manner satisfactory to the USGS. We have subsequently furnished data as requested by all government agencies.

Since this matter has been pending for these 10 years, we, again, request that our applications and requests for leases herein be granted.



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IMPACT STATEMENTS

The Final Environmental Impact Statement seriously considered protection of animal and plant life, as well as, protection of the quality of life for the people in this section of Florida. The Draft Supplement, which we are discussing here, has much repetition of material in the Final Statement, and in some cases it appears that the submittors of the Supplement data had to reach afar to make a Supplement at all. We believe the Final Environmental Impact Statement was adequate, and that the leases should be issued without being further encumbered by the Draft Supplement.

ANIMAL LIFE IN THE FOREST

The Final Statement listed 22 Amphibians; the Supplement added 14 - of the 14 added, none were on the U.S. endangered or threatened list and only the Gopher Frog was included in the Florida threatened group.

The Final Statement listed 34 Reptiles; the Supplement added 32 - of the 32 added, only the Suwanee Cooter is on the Florida threatened list; none are on the endangered list for either the U.S. or the State of Florida, and none of the additions are in the U.S. endangered group.

The Final Statement included 26 Mammals; the Supplement added 23, but of all the 23 added, only the Gray Bat was on the U.S. and Florida endangered list.

The Final Statement included 55 Birds; the Supplement added 77 - of the 77 added, the Wood Stork appears on the Florida endangered list, but not on the U.S. threatened or endangered list. The Bald Eagle was added and is on the U.S. endangered list and in the Florida threatened group, but as a matter of interest regarding this list of supplemental birds, and specifically the Bald Eagle, I wish to refer to a publication titled, "Osceola National Forest Phosphate Extraction and Processing: Impacts On Federally Listed Threatened Or Endangered And Other Species of Concern." Prepared by: National Fish and Wildlife Laboratory, Gainesville Field Station, Gainesville, Florida 32601. Prepared for: Office of Biological Services, Fish and Wildlife Service, U.S. Department of the Interior, Washington, D. C. 20240, in March of 1978. On page 274, I quote a paragraph from this publication:

> "New habitats created during mining in the Osceola National Forest will prove beneficial to many species of wildlife, some of which are considered in some form of endangerment. Storage ponds for tailings and clayey wastes will provide quality habitat for numerous species of wading birds. Ospreys can be expected to utilize these temporary ponds, and wintering waterfowl will certainly find conditions suitable for their usage. The Bald Eagle could be the only endangered species to benefit during a mining operation."

The added Sandhill Crane appears in the Florida threatened group but in neither the U.S. threatened nor endangered classification. The Red-Cockaded Woodpecker, referred to in the Supplement, was listed in the Final Environmental Impact Statement. This bird appears in

both the U.S. and Florida endangered group. Apparently, the Final Statement gave adequate consideration for this bird - of the other 77 added in the Supplement, the Bachman Warbler is the only other one to appear on the U.S. and Florida endangered list.

The Final Statement contained 44 Fish; the Supplement added 20 - of the 20 added, none were included on either the U.S. or Florida's endangered or threatened list. In fact, of the 44 in the Final Statement, none were on either the U.S. or Florida's threatened or endangered list. As shown by the above example dealing with the wildlife of the forest, much of the Supplement is made up by repeated material from the Final Statement.

The Final Impact Statement adequately dealt with the concern and protection of the animal life in the forest. This Final Impact Statement was believed to be adequate for issuance of the leases. As covered above, many additions of various categories of animal life have been added in the Draft Supplement. If the Final Environmental Impact Statement allowed proper protection of the animal life, then those added in the Draft Supplement can also be protected along with the original list.

Pittsburg & Midway is prepared to conduct its mining operations in conformance with applicable Federal and State mining law. Along with these requirements, we shall have proper concern for the animal and plant life in the Osceola National Forest, and for the people in the surrounding areas. Regarding protection of the animal life, those of you not familiar with surface mining may conclude that, all animal life is obliterated in the mining area, when in reality, there

is much coexistence. The coyote is a free, wary animal; we have noticed them at night within 200 feet of our dragline in southern Missouri. At another mine, south of Steamboat Springs, Colorado, at 8,000 ft. elevation where it is tedious to maintain adequate plant life for the animal population, even without mining, deer at this operation do come within a few hundred feet of the dragline and trucks. Elk and other animal life, coexist with the men, machinery and buildings.

The Supplement suggests areas of exclusion to he Deep Creek, Impassable Bay, Big Gum Swamp and the Red-Cockaded Woodpecker concentration area, south of FS Road 278, and a 200-acre additional area for each existing and later-discovered Red-Cockaded Woodpecker colony in the potential phosphate deposit area. These comprise about 5,000 acres of the 28,000 acres of the potential phosphate deposits.

The following statement may sound facetious; however, I intend it in a very serious manner. This Supplement states there are 30 to 60 colonies of woodpeckers in the forest. Their existence, apparently, depend on open, park-like stands of southern pines that include some trees infected by a heart rot fungus that enables cavity construction. Cavity trees are at least 60 years of age. Now if the mining companies are successful in harming few of these trees, and the colonies flourish, each new colony must have an additional 200 acres or, in this case, success could completely use up the mining areas with these allotments.

We believe that the people of Florida should at least have equal standing with the Red-Cockaded Woodpecker. Florida contains 59,560 square miles - the 1975 population had 8.4 million people. This

allows 4.47 acres per person--should each person be allowed the same amount of land as herein allocated for the Red-Cockaded Wookpecker colony, the State of Florida could only accommodate 187,000 people or 8.2 million would be forced to leave. This is 2 million more people than were reportedly murdered by Hitler in the various murder camps of Germany in World War II. Should we apply the same principle to the whole U.S.A., where we have approximately 60 people per square mile or one person per 10 1/2 acres, and should each person in these United States be considered equal to a colony of Red-Cockaded Woodpeckers, this country could support only 11.5 million people; the same as the present population of Pennsylvania and equal to the population of the U.S. in 1830 - 150 years ago.

Our phosphate area contains 4,300 tons per acre. At a selling price of $27 per ton, the gross yield for each acre would be $116,000. Should 200 more acres of mining land be allotted to a colony of Red-Cockaded Woodpeckers, a gross yield of $23.2 million would be cancelled out. We do not intend these figures to show lack of concern for animal life in the forest, but can a country stand this kind of thinking with the national debt being $830 billion? We must have concern for the sick, the old, and the needy people of America. Hospital costs in America can well average $275 per day or $100,000. per year. The gross value of phosphate lost here for each colony is equal to keeping 232 people in a hospital for 365 days. You may counter by saying, "But the money gained, would it go for this purpose?" Assumption is sometimes made in hearings of this nature, that most all the yield from the product is profit for the person mining. This is not true. The payroll to the local community is a major cost, initial machinery and buildings and continuous purchase of supplies is also major. Too, it is usually conceded that one basic job creates behind it, in services, 1.8 additional jobs.

I do believe, that finally, most of the yield from a mining project is filtered into the money supply of the State and the U.S.A. You may counter again by saying, "But mining is ugly; we like to look at undisturbed countryside." I cannot argue with this with a strong heart, except, America in general would be more beautiful without railroads, railroad shops, truck terminals, cement plants, manufacturing plants of all nature, massive road cuts for our highway system, quarries, sawmills, and a myriad of other nonbeautiful places where men and women work. Though America would be more beautiful without these places of business, no one, so far as I know, has worked out a method for maintaining hospitals, schools, medical centers, clinics, churches, necessary government buildings, national and state parks, coastal recreation areas, tourist centers, museums, and those things that sustain life and also give it quality without also allowing some of those necessary work places, where the money is generated, to provide health giving and beautiful things.

One has a tendency, I suppose, in meetings of this nature, to promise more than is humanly possible - hoping that the promise will be lost in the future. We have had a 90 year history in mining, and have learned not to promise those things which we cannot do. We do believe we can mine in the forest in a manner so that the land will be reclaimed satisfactorily - our coexistence with the animal life will be satisfactory so that it is not ruined, and in so doing, we can be of service to the community and to the agricultural needs of

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Comments on the Draft Supplement to
the Final Environmental Impact Statement
for Phosphate Leasing on the Osceola
National Forest, Florida

by the

Suwannee River Coalition
622 North Main St.
Gainesville, Fl. 32601

as presented by

J. Frank Sedmera

May 9, 1979

The Final Environmental Impact Statement of 1974 and now the Draft Supplement represent significant improvements in the assessment of impacts both on and off Forest lands. The 1973 Draft EIS was quite deficient.

The statement does recognize that present rehabilitation methods have left the land much different than prior to mining. It appropriately uses the term "primitive" to describe the state of the art in land rehabilitation. It does fairly consistently indicate that a commercial forest may never be re-established on mined land.

It acknowledges that certain habitats in the Osceola should not be disturbed, even if they could possibly be replaced eventually. It also acknowledges that it is almost certain that some important habitats would never be re-established.

It seems to address most of the issues raised during the comment period on the draft EIS. It does this in a fairly straight-forward and reasonably complete manner. This displays an attitude of responsiveness, concern, and professional ethics on the part of a number of federal agencies that we welcome and appreciate. The fact that we still have constructive criticism to offer about the Impact Statement should not be interpreted that we somehow consider ourselves as adversaries. We do not.

We have adopted certain positions concerning the Draft Supplement and Final EIS. These positions are summarized below.

POSITIONS

1. The Draft Supplement makes some important assumptions that we do not believe are reasonable to make. These assumptions then lead to an inadequate assessment.
2. Bad data is used in the section on stream water quality projections. This data then leads to an improper projection of future stream water quality.
3. The draft ignores the evidence of biological damage that is severe in Swift Creek and claims, instead, that "the biological significance of elevated concentrations of various constituents is not known." We maintain that the evidence available clearly indicates that the biological systems in Swift Creek are severely stressed by chemical conditions in Swift Creek.
4. The Draft does not consider the impact of elevated levels of radioactivity, associated with mined lands, on wildlife or humans, either on or off of the Forest. This impact should be addressed to the

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An elaboration on these positions follows.

Position 1: Incorrect Assumptions

a. Research on what the physical requirements are for existing vegetation in the Forest can and, more importantly, will be successfully done in time to provide meaningful guidance during the rehabilitation work.
(pg. I-8)

b. Companies mining in ONF will be willing to change to new rehabilitation methods as any research that is done points to a need for that change.
(pg. I-8)

c. Revegetation efforts on overburden and debris from mining operations that took place during the 1920's justify the hope that commercial revegetation can be accomplished on the slimes and sand tailings of modern mines.
(pg. I-6)

d. The storage of slimes off of the ONF site would mean that surface radiation levels in ONF would not increase.
(pg. III-1)

e. Gypsum ponds, with their attendant chemical and radiation problems will not occur, since there will be no chemical plant.
(pg. III-2)

f. Since no mining would occur in Watertown Lake, no change in lake water quality would occur.
(pg. III-4)

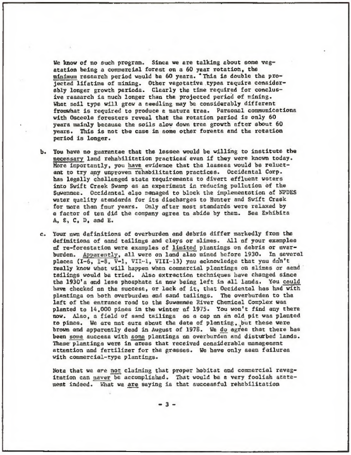
g. The replacement of overburden on top of slimes would return surface background radiation to near normal levels.
(pg. VIII-13)

h. If the lease applications were denied, alternate sources would have to be developed to make up the "deficit" or consumption would have to be reduced. (pg. VIII-14)

RESPONSES

a. No evidence is presented that the specific research needed to determine the physical requirements for existing vegetation is even being contemplated.

- 2 -

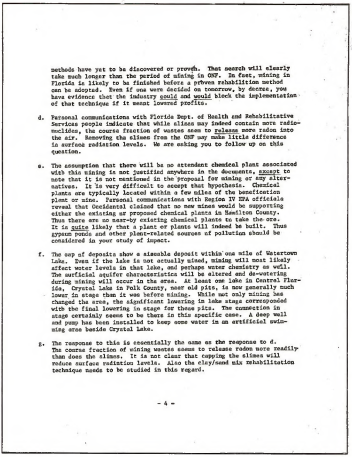


We know of no such program. Since we are talking about some vegetation being a commercial forest on a 60 year rotation, the minimum research period would be 60 years. This is double the projected lifetime of mining. Other vegetative types require considerably longer growth periods. Clearly the time required for conclusive research is much longer than the projected period of mining. What soil type will grow a seedling may be considerably different fromwhat is required to produce a mature tree. Personal communications with Osceola foresters reveal that the rotation period is only 60 years mainly because the soils slow down tree growth after about 60 years. This is not the case in some other forests and the rotation period is longer.

b. You have no guarantee that the lessee would be willing to institute the necessary land rehabilitation practices even if they were known today. More importantly, you have evidence that the lessees would be reluctant to try any unproven rehabilitation practices. Occidental Corp. has legally challenged state requirements to divert effluent waters into Swift Creek Swamp as an experiment in reducing pollution of the Suwannee. Occidental also managed to block the implementation of NPDES water quality standards for its discharges to Hunter and Swift Creek for more than four years. Only after most standards were relaxed by a factor of ten did the company agree to abide by them. See Exhibits A, B, C, D, and E.

c. Your own definitions of overburden and debris differ markedly from the definitions of sand tailings and clays or slimes. All of your examples of re-forestation were examples of limited plantings on debris or overburden. Apparently, all were on land also mined before 1930. In several places (I-6, I-8, V-1, VII-1, VIII-13) you acknowledge that you don't really know what will happen when commercial plantings on slimes or sand tailings would be tried. Also extraction techniques have changed since the 1930's and less phosphate is now being left in all lands. You could have checked on the success, or lack of it, that Occidental has had with plantings on both overburden and sand tailings. The overburden to the left of the entrance road to the Suwannee River Chemical Complex was planted to 14,000 pines in the winter of 1975. You won't find any there now. Also, a field of sand tailings as a cap on an old pit was planted to pines. We are not sure about the date of planting, but these were brown and apparently dead in August of 1978. We do agree that there has been some success with some plantings on overburden and disturbed lands. These plantings were in areas that received considerable management attention and fertilizer for the grasses. We have only seen failures with commercial-type plantings.

Note that we are not claiming that proper habitat and commercial revegitation can never be accomplished. That would be a very foolish statement indeed. What we are saying is that successful rehabilitation



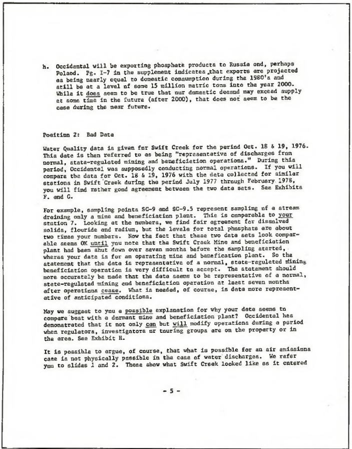
methods have yet to be discovered or proven. That search will clearly take much longer than the period of mining in ONF. In fact, mining in Florida is likely to be finished before a proven rehabilition method can be adopted. Even if one were decided on tomorrow, by decree, you have evidence that the industry could and would block the implementation of that technique if it meant lowered profits.

d. Personal communications with Florida Dept. of Health and Rehabilitative Services people indicate that while slimes may indeed contain more radionuclides, the course fraction of wastes seem to release more radon into the air. Removing the slimes from the ONF may make little difference in surface radiation levels. We are asking you to follow up on this question.

e. The assumption that there will be no attendant chemical plant associated with this mining is not justified anywhere in the documents, except to note that it is not mentioned in the proposal for mining or any alternatives. It is very difficult to accept that hypothesis. Chemical plants are typically located within a few miles of the benefication plant or mine. Personal communications with Region IV EPA officials reveal that Occidental claimed that no new mines would be supporting either the existing or proposed chemical plants in Hamilton County. Thus there are no near-by existing chemical plants to take the ore. It is quite likely that a plant or plants will indeed be built. Thus gypsum ponds and other plant-related sources of pollution should be considered in your study of impact.

f. The map of deposits show a sizeable deposit within one mile of Watertown Lake. Even if the lake is not actually mined, mining will most likely affect water levels in that lake, and perhaps water chemistry as well. The surficial aquifer characteristics will be altered and de-watering during mining will occur in the area. At least one lake in Central Florida, Crystal Lake in Polk County, near old pits, is now generally much lower in stage than it was before mining. While not only mining has changed the area, the significant lowering in lake stage corresponded with the final lowering in stage for these pits. The connection in stage certainly seems to be there in this specific case. A deep well and pump has been installed to keep some water in an artificial swimming area beside Crystal Lake.

g. The response to this is essentially the same as the response to d. The coarse fraction of mining wastes seems to release radon more readily than does the slimes. It is not clear that capping the slimes will reduce surface radiation levels. Also the clay/sand mix rehabilitation technique needs to be studied in this regard.



h. Occidental will be exporting phosphate products to Russia and, perhaps Poland. Pg. I-7 in the supplement indicates that exports are projected as being nearly equal to domestic consumption during the 1980's and still be at a level of some 15 million metric tons into the year 2000. While it does seem to be true that our domestic demand may exceed supply at some time in the future (after 2000), that does not seem to be the case during the near future.

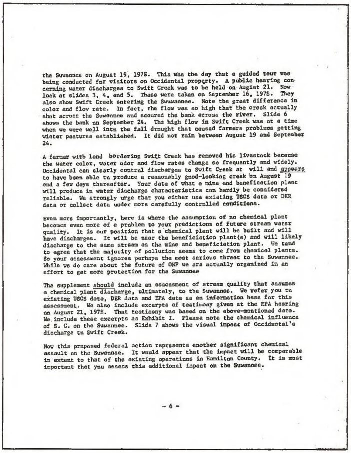
Position 2: Bad Data

Water Quality data is given for Swift Creek for the period Oct. 18 & 19, 1976. This data is then referred to as being "representative of discharges from normal, state-regulated mining and beneficiation operations." During this period, Occidental was supposedly conducting normal operations. If you will compare the data for Oct. 18 & 19, 1976 with the data collected for similar stations in Swift Creek during the period July 1977 through February 1978, you will find rather good agreement between the two data sets. See Exhibits F. and G.

For example, sampling points SC-9 and SC-9.5 represent sampling of a stream draining only a mine and beneficiation plant. This is comparable to your station 7. Looking at the numbers, we find fair agreement for dissolved solids, flouride and radium, but the levels for total phosphate are about two times your numbers. Now the fact that these two data sets look comparable seems OK until you note that the Swift Creek Mine and beneficiation plant had been shut down over seven months before the sampling started, whereas your data is for an operating mine and benefication plant. So the statement that the data is representative of a normal, state-regulated mining beneficiation operation is very difficult to accept. The statement should more accurately be made that the data seems to be representative of a normal, state-regulated mining and beneficiation operation at least seven months after operations cease. What is needed, of course, is data more representative of anticipated conditions.

May we suggest to you a possible explanation for why your data seems to compare best with a dormant mine and beneficiation plant? Occidental has demonstrated that it not only can but will modify operations during a period when regulators, investigators or touring groups are on the property or in the area. See Exhibit H.

It is possible to argue, of course, that what is possible for an air emissions case is not physically possible in the case of water discharges. We refer you to slides 1 and 2. These show what Swift Creek looked like as it entered



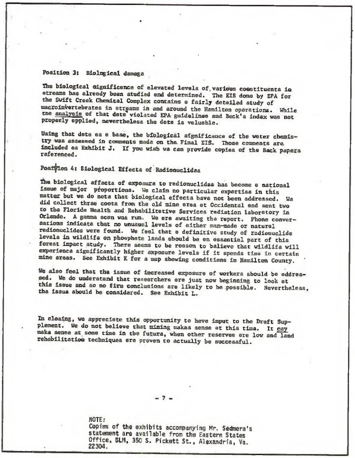
the Suwannee on August 19, 1978. This was the day that a guided tour was being conducted for visitors on Occidental property. A public hearing concerning water discharges to Swift Creek was to be held on August 21. Now look at slides 3, 4, and 5. These were taken on September 16, 1978. They also show Swift Creek entering the Suwannee. Note the great difference in color and flow rate. In fact, the flow was so high that the creek actually shot across the Suwannee and scoured the bank across the river. Slide 6 shows the bank on September 24. The high flow in Swift Creek was at a time when we were well into the fall drought that caused farmers problems getting winter pastures established. It did not rain between August 19 and September 24.

A farmer with land bordering Swift Creek has removed his livestock because the water color, water odor and flow rates change so frequently and widely. Occidental can clearly control discharges to Swift Creek at will and appears to have been able to produce a reasonably good-looking creek on August 19 and a few days thereafter. Your data of what a mine and benefication plant will produce in water discharge characteristics can hardly be considered reliable. We strongly urge that you either use existing USGS data or DER data or collect data under more carefully controlled conditions.

Even more importantly, here is where the assumption of no chemical plant becomes even more of a problem to your predictions of future stream water quality. It is our position that a chemical plant will be built and will have discharges. It will be near the beneficiation plant(s) and will likely discharge to the same stream as the mine and beneficiation plant. We tend to agree that the majority of pollution seems to come from chemical plants. So your assessment ignores perhaps the most serious threat to the Suwannee. While we do care about the future of ONF we are actually organized in an effort to get more protection for the Suwannee

The supplement should include an assessment of stream quality that assumes a chemical plant discharge, ultimately, to the Suwannee. We refer you to existing USGS data, DER data and EPA data as an information base for this assessment. We also include excerpts of testimony given at the EPA hearing on August 21, 1978. That testimony was based on the above-mentioned data. We include these excerpts as Exhibit I. Please note the chemical influence of S. C. on the Suwannee. Slide 7 shows the visual impact of Occidental's discharge to Swift Creek.

Now this proposed federal action represents another significant chemical assault on the Suwannee. It would appear that the impact will be comparable in extent to that of the existing operations in Hamilton County. It is most important that you assess this additional impact on the Suwannee.



Position 3: Biological damage

The biological significance of elevated levels of various constituents in streams has already been studied and determined. The EIS done by EPA for the Swift Creek Chemical Complex contains a fairly detailed study of macroinvertebrates in streams in and around the Hamilton operations. While the analysis of that data violated EPA guidelines and Beck's index was not properly applied, nevertheless the data is valuable.

Using that data as a base, the biological significance of the water chemistry was assessed in comments made on the Final EIS. Those comments are included as Exhibit J. If you wish we can provide copies of the Beck papers referenced.

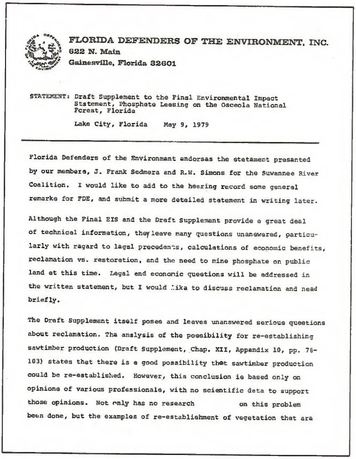
Position 4: Biological Effects of Radionuclides

The biological effects of exposure to radionuclides has become a national issue of major proportions. We claim no particular expertise in this matter but we do note that biological effects have not been addressed. We did collect three coots from the old mine area at Occidental and sent two to the Florida Health and Rehabilitative Services radiation laboratory in Orlando. A gamma scan was run. We are awaiting the report. Phone conversations indicate that no unusual levels of either man-made or natural radionuclides were found. We feel that a definitive study of radionuclide levels in wildlife on phosphate lands should be an essential part of this forest impact study. There seems to be reason to believe that wildlife will experience significantly higher exposure levels if it spends time in certain mine areas. See Exhibit K for a map showing conditions in Hamilton County.

We also feel that the issue of increased exposure of workers should be addressed. We do understand that researchers are just now beginning to look at this issue and so no firm conclusions are likely to be possible. Nevertheless, the issue should be considered. See Exhibit L.

In closing, we appreciate this opportunity to have input to the Draft Supplement. We do not believe that mining makes sense at this time. It may make sense at some time in the future, when other reserves are low and land rehabilitation techniques are proven to actually be successful.

NOTE:
Copies of the exhibits accompanying Mr. Sedmera's statement are available from the Eastern States Office, BLM, 350 S. Pickett St., Alexandria, Va. 22304.



FLORIDA DEFENDERS OF THE ENVIRONMENT, INC.
622 N. Main
Gainesville, Florida 32601

STATEMENT: Draft Supplement to the Final Environmental Impact Statement, Phosphate Leasing on the Osceola National Forest, Florida

Lake City, Florida May 9, 1979

Florida Defenders of the Environment endorses the statement presented by our members, J. Frank Sedmera and R.W. Simons for the Suwannee River Coalition. I would like to add to the hearing record some general remarks for FDE, and submit a more detailed statement in writing later.

Although the Final EIS and the Draft Supplement provide a great deal of technical information, they leave many questions unanswered, particularly with regard to legal precedents, calculations of economic benefits, reclamation vs. restoration, and the need to mine phosphate on public land at this time. Legal and economic questions will be addressed in the written statement, but I would like to discuss reclamation and need briefly.

The Draft Supplement itself poses and leaves unanswered serious questions about reclamation. The analysis of the possibility for re-establishing sawtimber production (Draft Supplement, Chap. XII, Appendix 10, pp. 76-103) states that there is a good possibility that sawtimber production could be re-established. However, this conclusion is based only on opinions of various professionals, with no scientific data to support those opinions. Not only has no research on this problem been done, but the examples of re-establishment of vegetation that are

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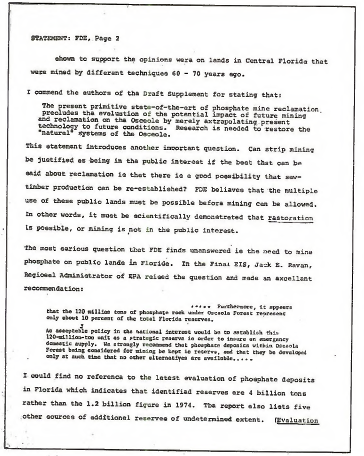

shown to support the opinions were on lands in Central Florida that were mined by different techniques 60 - 70 years ago.

I commend the authors of the Draft Supplement for stating that:

> The present primitive state-of-the-art of phosphate mine reclamation precludes the evaluation of the potential impact of future mining and reclamation on the Osceola by merely extrapolating present technology to future conditions. Research is needed to restore the "natural" systems of the Osceola.

This statement introduces another important question. Can strip mining be justified as being in the public interest if the best that can be said about reclamation is that there is a good possibility that saw-timber production can be re-established? FDE believes that the multiple use of these public lands must be possible before mining can be allowed. In other words, it must be scientifically demonstrated that restoration is possible, or mining is not in the public interest.

The most serious question that FDE finds unanswered is the need to mine phosphate on public lands in Florida. In the Final EIS, Jack E. Ravan, Regional Administrator of EPA raised the question and made an excellent recommendation:

> ..... Furthermore, it appears that the 120 million tons of phosphate rock under Osceola Forest represent only about 10 percent of the total Florida reserves.
>
> An acceptable policy in the national interest would be to establish this 120-million-ton unit as a strategic reserve in order to insure an emergency domestic supply. We strongly recommend that phosphate deposits within Osceola Forest being considered for mining be kept in reserve, and that they be developed only at such time that no other alternatives are available.....

I could find no reference to the latest evaluation of phosphate deposits in Florida which indicates that identified reserves are 4 billion tons rather than the 1.2 billion figure in 1974. The report also lists five other sources of additional reserves of undetermined extent. (Evaluation

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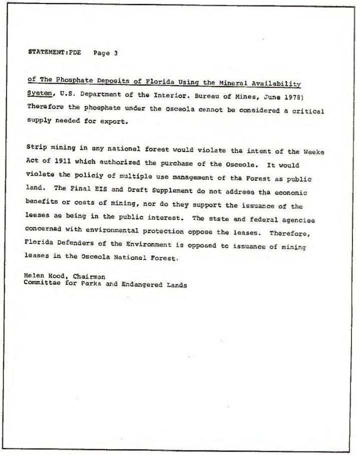
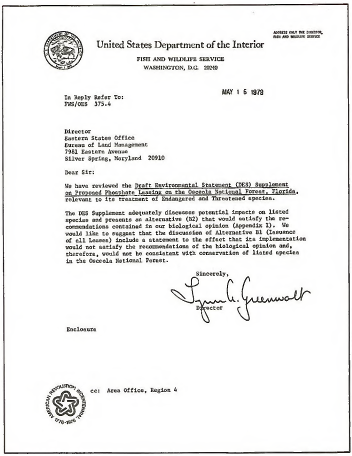


of The Phosphate Deposits of Florida Using the Mineral Availability System, U.S. Department of the Interior. Bureau of Mines, June 1978) Therefore the phosphate under the Osceola cannot be considered a critical supply needed for export.

Strip mining in any national forest would violate the intent of the Weeks Act of 1911 which authorized the purchase of the Osceola. It would violate the policiy of multiple use management of the Forest as public land. The Final EIS and Draft Supplement do not address the economic benefits or costs of mining, nor do they support the issuance of the leases as being in the public interest. The state and federal agencies concerned with environmental protection oppose the leases. Therefore, Florida Defenders of the Environment is opposed to issuance of mining leases in the Osceola National Forest.

Helen Hood, Chairman
Committee for Parks and Endangered Lands



United States Department of the Interior
FISH AND WILDLIFE SERVICE
WASHINGTON, D.C. 20240

ADDRESS ONLY THE DIRECTOR,
FISH AND WILDLIFE SERVICE

MAY 1 6 1979

In Reply Refer To:
FWS/OES 375.4

Director
Eastern States Office
Bureau of Land Management
7981 Eastern Avenue
Silver Spring, Maryland 20910

Dear Sir:

We have reviewed the Draft Environmental Statement (DES) Supplement on Proposed Phosphate Leasing on the Osceola National Forest, Florida, relevant to its treatment of Endangered and Threatened species.

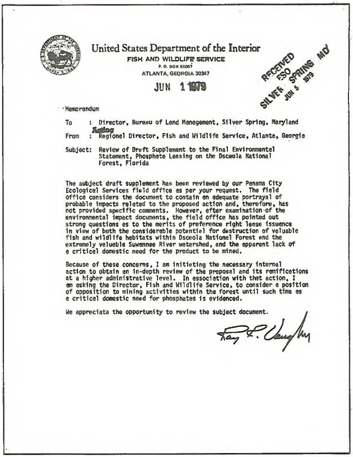
The DES Supplement adequately discusses potential impacts on listed species and presents an alternative (B2) that would satisfy the recommendations contained in our biological opinion (Appendix I). We would like to suggest that the discussion of Alternative B1 (Issuance of all Leases) include a statement to the effect that its implementation would not satisfy the recommendations of the biological opinion and, therefore, would not be consistent with conservation of listed species in the Osceola National Forest.

Sincerely,

Lynn A. Greenwalt
Director

Enclosure

cc: Area Office, Region 4



United States Department of the Interior
FISH AND WILDLIFE SERVICE
P. O. BOX 95067
ATLANTA, GEORGIA 30347

RECEIVED
ESO
SILVER SPRING MD
JUN 5 1979

JUN 1 1979

Memorandum

To : Director, Bureau of Land Management, Silver Spring, Maryland

From : Acting Regional Director, Fish and Wildlife Service, Atlanta, Georgia

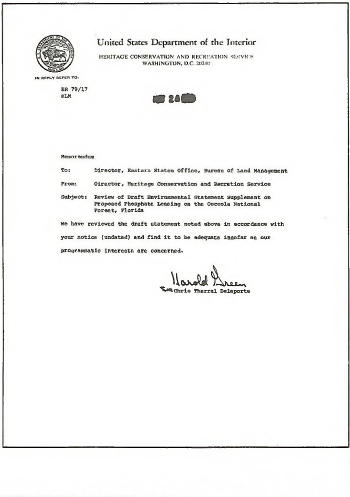
Subject: Review of Draft Supplement to the Final Environmental Statement, Phosphate Leasing on the Osceola National Forest, Florida

The subject draft supplement has been reviewed by our Panama City Ecological Services field office as per your request. The field office considers the document to contain an adequate portrayal of probable impacts related to the proposed action and, therefore, has not provided specific comments. However, after examination of the environmental impact documents, the field office has pointed out strong questions as to the merits of preference right lease issuence in view of both the considerable potential for destruction of valuable fish and wildlife habitats within Osceola National Forest and the extremely valuable Suwannee River watershed, and the apparent lack of a critical domestic need for the product to be mined.

Because of these concerns, I am initiating the necessary internal action to obtain an in-depth review of the proposal and its ramifications at a higher administrative level. In association with that action, I am asking the Director, Fish and Wildlife Service, to consider a position of opposition to mining activities within the forest until such time as a critical domestic need for phosphates is evidenced.

We appreciate the opportunity to review the subject document.

Ray L. Vaughn



United States Department of the Interior
HERITAGE CONSERVATION AND RECREATION SERVICE
WASHINGTON, D.C. 20240

IN REPLY REFER TO:
ER 79/17
BLM

[illegible] 24 [illegible]

Memorandum

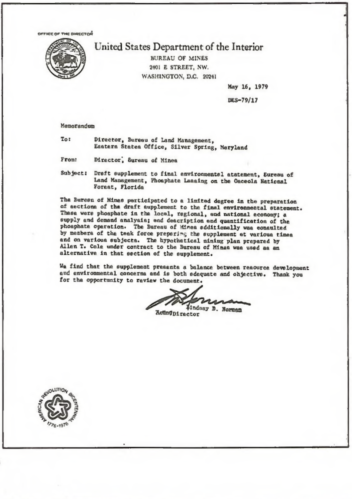
To: Director, Eastern States Office, Bureau of Land Management

From: Director, Heritage Conservation and Recreation Service

Subject: Review of Draft Environmental Statement Supplement on Proposed Phosphate Leasing on the Osceola National Forest, Florida

We have reviewed the draft statement noted above in accordance with your notice (undated) and find it to be adequate insofar as our programmatic interests are concerned.

Harold Green
for Chris Therral Delaporte



OFFICE OF THE DIRECTOR
United States Department of the Interior
BUREAU OF MINES
2401 E STREET, NW.
WASHINGTON, D.C. 20241

May 16, 1979

DES-79/17

Memorandum

To: Director, Bureau of Land Management,
Eastern States Office, Silver Spring, Maryland

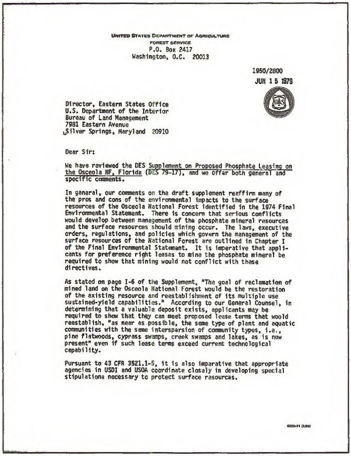
From: Director, Bureau of Mines

Subject: Draft supplement to final environmental statement, Bureau of Land Management, Phosphate Leasing on the Osceola National Forest, Florida

The Bureau of Mines participated to a limited degree in the preparation of sections of the draft supplement to the final environmental statement. These were phosphate in the local, regional, and national economy; a supply and demand analysis; and description and quantification of the phosphate operation. The Bureau of Mines additionally was consulted by members of the task force preparing the supplement at various times and on various subjects. The hypothetical mining plan prepared by Allen T. Cole under contract to the Bureau of Mines was used as an alternative in that section of the supplement.

We find that the supplement presents a balance between resource development and environmental concerns and is both adequate and objective. Thank you for the opportunity to review the document.

Lindsay D. Norman
Acting Director



UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
P.O. Box 2417
Washington, D.C. 20013

1950/2800
JUN 15 1979

Director, Eastern States Office
U.S. Department of the Interior
Bureau of Land Management
7981 Eastern Avenue
Silver Springs, Maryland 20910

Dear Sir:

We have reviewed the DES Supplement on Proposed Phosphate Leasing on the Osceola NF, Florida (DES 79-17), and we offer both general and specific comments.

In general, our comments on the draft supplement reaffirm many of the pros and cons of the environmental impacts to the surface resources of the Osceola National Forest identified in the 1974 Final Environmental Statement. There is concern that serious conflicts would develop between management of the phosphate mineral resources and the surface resources should mining occur. The laws, executive orders, regulations, and policies which govern the management of the surface resources of the National Forest are outlined in Chapter I of the Final Environmental Statement. It is imperative that applicants for preference right leases to mine the phosphate mineral be required to show that mining would not conflict with these directives.

As stated on page I-6 of the Supplement, "The goal of reclamation of mined land on the Osceola National Forest would be the restoration of the existing resource and reestablishment of its multiple use sustained-yield capabilities." According to our General Counsel, in determining that a valuable deposit exists, applicants may be required to show that they can meet proposed lease terms that would reestablish, "as near as possible, the same type of plant and aquatic communities with the same interspersion of community types, i.e., pine flatwoods, cypress swamps, creek swamps and lakes, as is now present" even if such lease terms exceed current technological capability.

Pursuant to 43 CFR 3521.1-5, it is also imperative that appropriate agencies in USDI and USDA coordinate closely in developing special stipulations necessary to protect surface resources.

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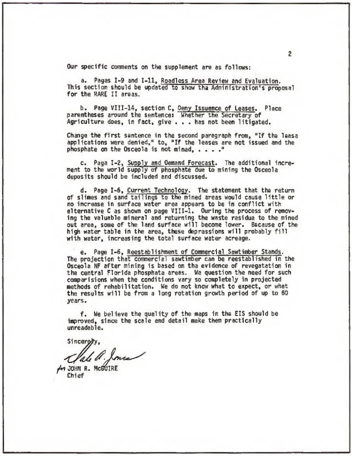

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Our specific comments on the supplement are as follows:

a. Pages I-9 and I-11, Roadless Area Review and Evaluation. This section should be updated to show the Administration's proposal for the RARE II areas.

b. Page VIII-14, section C, Deny Issuence of Leases. Place parentheses around the sentence: Whether the Secretary of Agriculture does, in fact, give . . . has not been litigated.

Change the first sentence in the second paragraph from, "If the lease applications were denied," to, "If the leases are not issued and the phosphate on the Osceola is not mined, ..."

c. Page I-2, Supply and Demand Forecast. The additional increment to the world supply of phosphate due to mining the Osceola deposits should be included and discussed.

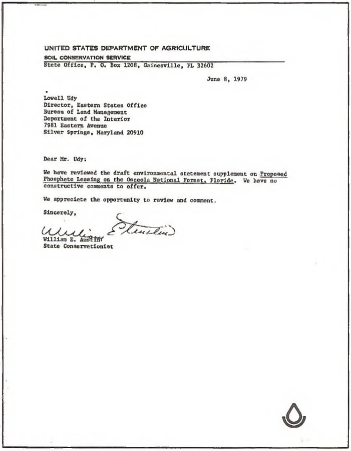
d. Page I-6, Current Technology. The statement that the return of slimes and sand tailings to the mined areas would cause little or no increase in surface water area appears to be in conflict with alternative C as shown on page VIII-1. During the process of removing the valuable mineral and returning the waste residue to the mined out area, some of the land surface will become lower. Because of the high water table in the area, these depressions will probably fill with water, increasing the total surface water acreage.

e. Page I-6, Reestablishment of Commercial Sawtimber Stands. The projection that commercial sawtimber can be reestablished in the Osceola NF after mining is based on the evidence of revegetation in the central Florida phosphate areas. We question the need for such comparisions when the conditions vary so completely in projected methods of rehabilitation. We do not know what to expect, or what the results will be from a long rotation growth period of up to 60 years.

f. We believe the quality of the maps in the EIS should be improved, since the scale and detail make them practically unreadable.

Sincerely,

for JOHN R. McGUIRE
Chief



UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
State Office, P. O. Box 1208, Gainesville, FL 32602

June 8, 1979

Lowell Udy
Director, Eastern States Office
Bureau of Land Management
Department of the Interior
7981 Eastern Avenue
Silver Springs, Maryland 20910

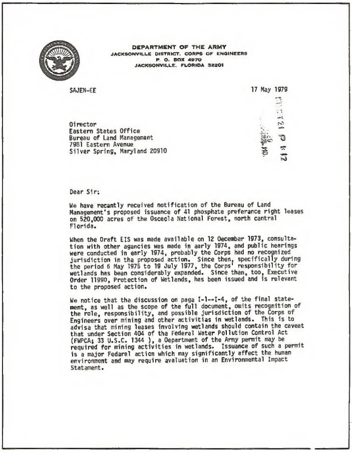
Dear Mr. Udy:

We have reviewed the draft environmental statement supplement on Proposed Phosphate Leasing on the Osceola National Forest, Florida. We have no constructive comments to offer.

We appreciate the opportunity to review and comment.

Sincerely,

William E. Austin
State Conservationist



DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT, CORPS OF ENGINEERS
P. O. BOX 4970
JACKSONVILLE, FLORIDA 32201

SAJEN-EE

17 May 1979

MAY 21 P 1:12

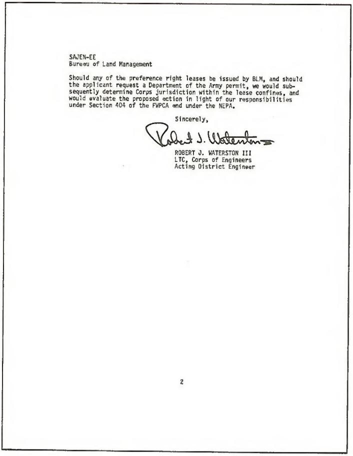
Director
Eastern States Office
Bureau of Land Management
7981 Eastern Avenue
Silver Spring, Maryland 20910

Dear Sir:

We have recently received notification of the Bureau of Land Management's proposed issuance of 41 phosphate preference right leases on 520,000 acres of the Osceola National Forest, north central Florida.

When the Draft EIS was made available on 12 December 1973, consultation with other agencies was made in early 1974, and public hearings were conducted in early 1974, probably the Corps had no recognized jurisdiction in the proposed action. Since then, specifically during the period 6 May 1975 to 19 July 1977, the Corps' responsibility for wetlands has been considerably expanded. Since then, too, Executive Order 11990, Protection of Wetlands, has been issued and is relevant to the proposed action.

We notice that the discussion on page I-1--I-4, of the final statement, as well as the scope of the full document, omits recognition of the role, responsibility, and possible jurisdiction of the Corps of Engineers over mining and other activities in wetlands. This is to advise that mining leases involving wetlands should contain the caveat that under Section 404 of the Federal Water Pollution Control Act (FWPCA; 33 U.S.C. 1344), a Department of the Army permit may be required for mining activities in wetlands. Issuance of such a permit is a major Federal action which may significantly affect the human environment and may require evaluation in an Environmental Impact Statement.



SAJEN-EE
Bureau of Land Management

Should any of the preference right leases be issued by BLM, and should the applicant request a Department of the Army permit, we would subsequently determine Corps jurisdiction within the lease confines, and would evaluate the proposed action in light of our responsibilities under Section 404 of the FWPCA and under the NEPA.

Sincerely,

Robert J. Waterston

ROBERT J. WATERSTON III
LTC, Corps of Engineers
Acting District Engineer

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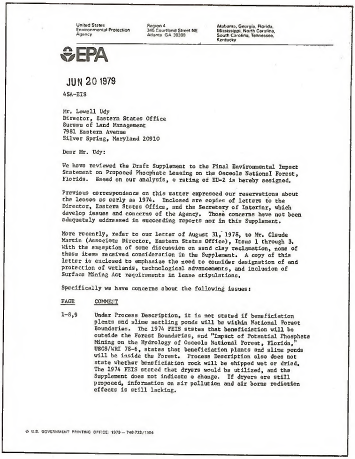


United States
Environmental Protection
Agency

Region 4
345 Courtland Street NE
Atlanta GA 30308

Alabama, Georgia, Florida,
Mississippi, North Carolina,
South Carolina, Tennessee,
Kentucky

EPA

JUN 20 1979

4SA-EIS

Mr. Lowell Udy
Director, Eastern States Office
Bureau of Land Management
7981 Eastern Avenue
Silver Spring, Maryland 20910

Dear Mr. Udy:

We have reviewed the Draft Supplement to the Final Environmental Impact Statement on Proposed Phosphate Leasing on the Osceola National Forest, Florida. Based on our analysis, a rating of EU-2 is hereby assigned.

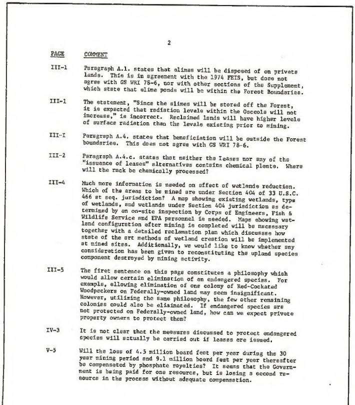
Previous correspondence on this matter expressed our reservations about the leases as early as 1974. Enclosed are copies of letters to the Director, Eastern States Office, and the Secretary of Interior, which develop issues and concerns of the Agency. Those concerns have not been adequately addressed in succeeding reports nor in this Supplement.

More recently, refer to our letter of August 31, 1978, to Mr. Claude Martin (Associate Director, Eastern States Office), Items 1 through 3. With the exception of some discussion on sand clay reclamation, none of these items received consideration in the Supplement. A copy of this letter is enclosed to emphasize the need to consider designation of and protection of wetlands, technological advancements, and inclusion of Surface Mining Act requirements in lease stipulations.

Specifically we have concerns about the following issues:

PAGE	COMMENT
1-8,9	Under Process Description, it is not stated if beneficiation plants and slime settling ponds will be within National Forest Boundaries. The 1974 FEIS states that beneficiation will be outside the Forest Boundaries, and "Impact of Potential Phosphate Mining on the Hydrology of Osceola National Forest, Florida," USGS/WRI 78-6, states that beneficiation plants and slime ponds will be inside the Forest. Process Description also does not state whether beneficiation rock will be shipped wet or dried. The 1974 FEIS stated that dryers would be utilized, and the Supplement does not indicate a change. If dryers are still proposed, information on air pollution and air borne radiation effects is still lacking.

☆ U.S. GOVERNMENT PRINTING OFFICE: 1979 — 748-732/1304



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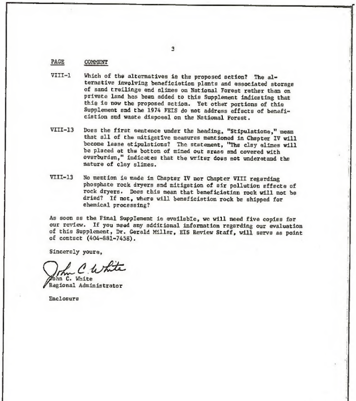
PAGE	COMMENT
III-1	Paragraph A.1. states that slimes will be disposed of on private lands. This is in agreement with the 1974 FEIS, but does not agree with GS WRI 78-6, nor with other sections of the Supplement, which state that slime ponds will be within the Forest Boundaries.
III-1	The statement, "Since the slimes will be stored off the Forest, it is expected that radiation levels within the Osceola will not increase," is incorrect. Reclaimed lands will have higher levels of surface radiation than the levels existing prior to mining.
III-I	Paragraph A.4. states that beneficiation will be outside the Forest boundaries. This does not agree with GS WRI 78-6.
III-2	Paragraph A.4.c. states that neither the leases nor any of the "issuence of leases" alternatives contains chemical plants. Where will the rock be chemically processed?
III-4	Much more information is needed on effect of wetlands reduction. Which of the areas to be mined are under Section 404 of 33 U.S.C. 466 et seq. jurisdiction? A map showing existing wetlands, type of wetlands, and wetlands under Section 404 jurisdiction as determined by an on-site inspection by Corps of Engineers, Fish & Wildlife Service and EPA personnel is needed. Maps showing wetland configuration after mining is completed will be necessary together with a detailed reclamation plan which discusses how state of the art methods of wetland creation will be implemented at mined sites. Additionally, we would like to know whether any consideration has been given to reconstituting the upland species component destroyed by mining activity.
III-5	The first sentence on this page constitutes a philosophy which would allow certain elimination of an endangered species. For example, allowing elimination of one colony of Red-Cockated Woodpeckers on Federally-owned land may seem insignificant. However, utilizing the same philosophy, the few other remaining colonies could also be eliminated. If endangered species are not protected on Federally-owned land, how can we expect private property owners to protect them?
IV-3	It is not clear that the measures discussed to protect endangered species will actually be carried out if leases are issued.
V-5	Will the loss of 4.5 million board feet per year during the 30 year mining period and 9.1 million board feet per year thereafter be compensated by phosphate royalties? It seems that the Government is being paid for one resource, but is losing a second resource in the process without adequate compensation.



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PAGE	COMMENT
VIII-1	Which of the alternatives is the proposed action? The alternative involving beneficiation plants and associated storage of sand trailings and slimes on National Forest rather than on private land has been added to this Supplement indicating that this is now the proposed action. Yet other portions of this Supplement and the 1974 FEIS do not address effects of beneficiation and waste disposal on the National Forest.
VIII-13	Does the first sentence under the heading, "Stipulations," mean that all of the mitigative measures mentioned in Chapter IV will become lease stipulations? The statement, "The clay slimes will be placed at the bottom of mined out areas and covered with overburden," indicates that the writer does not understand the nature of clay slimes.
VIII-13	No mention is made in Chapter IV nor Chapter VIII regarding phosphate rock dryers and mitigation of air pollution effects of rock dryers. Does this mean that beneficiation rock will not be dried? If not, where will beneficiation rock be shipped for chemical processing?

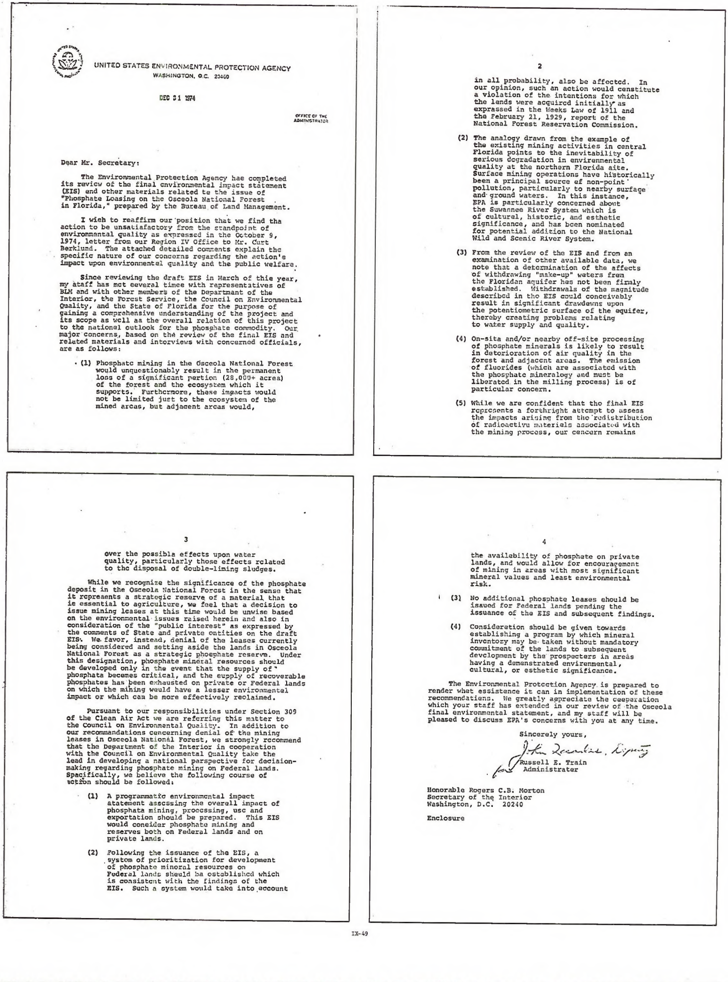
As soon as the Final Supplement is available, we will need five copies for our review. If you need any additional information regarding our evaluation of this Supplement, Dr. Gerald Miller, EIS Review Staff, will serve as point of contact (404-881-7458).

Sincerely yours,

John C. White

John C. White
Regional Administrator

Enclosure



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

DEC 31 1974

OFFICE OF THE
ADMINISTRATOR

Dear Mr. Secretary:

The Environmental Protection Agency has completed its review of the final environmental impact statement (EIS) and other materials related to the issue of "Phosphate Leasing on the Osceola National Forest in Florida," prepared by the Bureau of Land Management.

I wish to reaffirm our position that we find the action to be unsatisfactory from the standpoint of environmental quality as expressed in the October 9, 1974, letter from our Region IV Office to Mr. Curt Berklund. The attached detailed comments explain the specific nature of our concerns regarding the action's impact upon environmental quality and the public welfare.

Since reviewing the draft EIS in March of this year, my staff has met several times with representatives of BLM and with other members of the Department of the Interior, the Forest Service, the Council on Environmental Quality, and the State of Florida for the purpose of gaining a comprehensive understanding of the project and its scope as well as the overall relation of this project to the national outlook for the phosphate commodity. Our major concerns, based on the review of the final EIS and related materials and interviews with concerned officials, are as follows:

(1) Phosphate mining in the Osceola National Forest would unquestionably result in the permanent loss of a significant portion (28,000+ acres) of the forest and the ecosystem which it supports. Furthermore, these impacts would not be limited just to the ecosystem of the mined areas, but adjacent areas would, in all probability, also be affected. In our opinion, such an action would constitute a violation of the intentions for which the lands were acquired initially as expressed in the Weeks Law of 1911 and the February 21, 1929, report of the National Forest Reservation Commission.

2

(2) The analogy drawn from the example of the existing mining activities in central Florida points to the inevitability of serious degradation in environmental quality at the northern Florida site. Surface mining operations have historically been a principal source of non-point pollution, particularly to nearby surface and ground waters. In this instance, EPA is particularly concerned about the Suwannee River System which is of cultural, historic, and esthetic significance, and has been nominated for potential addition to the National Wild and Scenic River System.

(3) From the review of the EIS and from an examination of other available data, we note that a determination of the affects of withdrawing "make-up" waters from the Floridan aquifer has not been firmly established. Withdrawals of the magnitude described in the EIS could conceivably result in significant drawdowns upon the potentiometric surface of the aquifer, thereby creating problems relating to water supply and quality.

(4) On-site and/or nearby off-site processing of phosphate minerals is likely to result in deterioration of air quality in the forest and adjacent areas. The emission of fluorides (which are associated with the phosphate mineralogy and must be liberated in the milling process) is of particular concern.

(5) While we are confident that the final EIS represents a forthright attempt to assess the impacts arising from the redistribution of radioactive materials associated with the mining process, our concern remains

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over the possible effects upon water quality, particularly those effects related to the disposal of double-liming sludges.

While we recognize the significance of the phosphate deposit in the Osceola National Forest in the sense that it represents a strategic reserve of a material that is essential to agriculture, we feel that a decision to issue mining leases at this time would be unwise based on the environmental issues raised herein and also in consideration of the "public interest" as expressed by the comments of State and private entities on the draft EIS. We favor, instead, denial of the leases currently being considered and setting aside the lands in Osceola National Forest as a strategic phosphate reserve. Under this designation, phosphate mineral resources should be developed only in the event that the supply of phosphate becomes critical, and the supply of recoverable phosphates has been exhausted on private or Federal lands on which the mining would have a lesser environmental impact or which can be more effectively reclaimed.

Pursuant to our responsibilities under Section 309 of the Clean Air Act we are referring this matter to the Council on Environmental Quality. In addition to our recommendations concerning denial of the mining leases in Osceola National Forest, we strongly recommend that the Department of the Interior in cooperation with the Council on Environmental Quality take the lead in developing a national perspective for decision-making regarding phosphate mining on Federal lands. Specifically, we believe the following course of action should be followed:

(1) A programmatic environmental impact statement assessing the overall impact of phosphate mining, processing, use and exportation should be prepared. This EIS would consider phosphate mining and reserves both on Federal lands and on private lands.

(2) Following the issuance of the EIS, a system of prioritization for development of phosphate mineral resources on Federal lands should be established which is consistent with the findings of the EIS. Such a system would take into account

4

the availability of phosphate on private lands, and would allow for encouragement of mining in areas with most significant mineral values and least environmental risk.

(3) No additional phosphate leases should be issued for Federal lands pending the issuance of the EIS and subsequent findings.

(4) Consideration should be given towards establishing a program by which mineral inventory may be taken without mandatory commitment of the lands to subsequent development by the prospecters in areas having a demonstrated environmental, cultural, or esthetic significance.

The Environmental Protection Agency is prepared to render what assistance it can in implementation of these recommendations. We greatly appreciate the cooperation which your staff has extended in our review of the Osceola final environmental statement, and my staff will be pleased to discuss EPA's concerns with you at any time.

Sincerely yours,

John Quarles, Deputy
for Russell E. Train
Administrator

Honorable Rogers C.B. Morton
Secretary of the Interior
Washington, D.C. 20240

Enclosure

Detailed Comments on BLM Final
Environmental Impact Statement for
"Phosphate Leasing on the Osceola National Forest in Florida"

General

EPA's comments on the draft environmental impact statement (EIS) on "Phosphate Leasing in Osceola National Forest" were transmitted to the Eastern States Office of the Bureau of Land Management from our Region IV Office in Atlanta on March 4, 1974. At that time the project was assigned a rating of "environmentally unsatisfactory." In addition, several specific comments related to the adequacy of the EIS in assessing the environmental impact of the proposed action.

Our review of the final EIS has indicated that the document is generally responsive to our comments on the draft, where practicable, but that additional investigations must be performed in order to more adequately assess the impact of the proposed action.

Our prime objection to the action is the terminal destruction of 28,000+ acres of the unique Osceola National Forest ecosystem which would result from the proposed phosphate mining operations. Even assuming that recommended investigations are performed in advance of the mining, a rescoping of the project in any fashion will not sufficiently mitigate this ominous impact. For this and other reasons discussed below, EPA continues to find the project unsatisfactory from the standpoint of environmental quality and public welfare.

Land Modification

The extensive and irreversible rescaping of the forest lands and the coincident alteration of the area's natural quality remains unquestionably the most pronounced effect resulting from the action. In our opinion, there are values that at the present time exceed the need for the mineral resources present in Osceola National Forest.

An examination of the minutes from the February 21, 1929 meeting of the National Forest Reservation Commission reveals the intent of the Commission in purchasing the Osceola Unit primarily centered about timber management with considerable interest expressed in maintaining swamp lands. This is highly consistent with the spirit of the Weeks Law of 1911 (specifically 16 U.S.C. 515),

the statutory authority by which the lands were acquired. Under this authority, the Secretary of Agriculture is authorized and directed to recommend for purchase "lands [which]...may be necessary to the regulation of the flow of navigable streams or for the production of timber...."

Considering the predicted destruction of some 40 percent of the forest's swamp lands and the permanent removal of some 9,000 acres from timber production with a decrease in timber productivity on about 20,000 acres, we feel that the action would constitute a considerable breach of fundamentals. In our view, Congress clearly intended that the forest ecosystem of lands acquired under the Weeks Law should be protected. Even though acquisition was authorized over 55 years ago and mineral needs have changed, the critical purpose of protecting the forest and swamp ecosystems should be the primary consideration in determining the priority of incompatible land uses.

Moreover, in its present state, Osceola National Forest harbors a fragile and unique ecosystem. Its wetlands, in particular, are the habitat for several endangered species, the protection of which is mandated to the Secretary of the Interior under the Endangered Species Act (16 U.S.C. 668ee to 668cc-6). Such habitat destruction would not merely result in relocation of present populations, but rather a decline in population. Swamps and wetlands also are important in providing groundwater recharge areas, natural fire breaks, buffering reservoirs for runoff, and scenic areas. Their elimination in a substantial part of the forest could very well result in adverse impacts for the remaining, undisturbed areas.

A reclamation program at best could only restore the land to impoundments, golf courses, light agricultural and low yield timber tracts, etc. In addition, the watershed hydrology of the Deep Creek Basin, which is a component of the Suwannee River System, would be severely altered as a result of the mining and reclamation. In fact, phosphate mining would preclude all management options for multiple use currently utilized by the Forest Service in the management of National Forests. We therefore feel that phosphate mining in Osceola National Forest is inconsistent with the Weeks Law, the Multiple Use-Sustained Yield ideology, and the proposed "Long Term Forestry Plan" of the Forest Service.

Water Quality

Surface Water

Surface mining operations have traditionally been a major contributor of non-point pollution to both surface and ground waters. In the relatively pristine area of Osceola National Forest, such non-point pollution would have the overall effect of continued deterioration of environmental quality. Of particular concern is the cumulative effect of increased pollution loadings upon the Suwannee River.

Runoff from spoil banks and unreclaimed lands can result in an increase in sediment and phosphate loads.

We understand that the Florida Pollution Control Board has set stricter standards for slime pond dike construction, but that these standards are still inadequate to eliminate the possibility of dike failure. If such failure would occur, the impact upon the Suwannee River would be disastrous.

Phosphates in concentrations above naturally occuring levels can effectively degrade the quality of surface water bodies through eutrophication. In Osceola National Forest, wetlands would be particularly threatened by an influx of additional phosphates. Data by Kaufman[1] seem to indicate the potential for serious phosphate contamination in areas of Florida where phosphate mining is highly active.

While the introduction of phosphates may not result in a pronounced effect upon swiftly flowing streams, such as the Suwannee River, increased loadings of suspended solids, the bisection of tributaries, and the introduction of other non-point pollutants can have an impact. Since the Suwannee River has been nominated as a National Wild and Scenic River, any degradation in the water quality and general esthetics of the stream should not be tolerated.

Ground Water

A great deal of speculation surrounds the prediction of the impacts of "make-up" water withdrawals upon water

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[1] Kaufman, Mathew I. (1969) Generalized distribution and concentration of orthophosphate in Florida streams: Florida Bureau of Geology, Map Sers. No. 33.

supply and quality for the area. This, of course, is indicative of data inadequacies. Of prime concern is the water supply for Lake City, Florida, which is in close proximity to Osceola National Forest.

The EIS states that "Withdrawals of water from the Floridan aquifer would lower the potentiometric surface over relatively large areas and affect water systems of Lake City and other users in the area. Measurable effects could extend several miles from the center of pumping." If sufficient drawdown occurs, salt water intrusion may result.

According to the Florida Code Chapter 373, Part II "Permitting of Consumptive Uses of Water," Sections 373.219 and 373.223, the State of Florida may require a permit for "make-up" water withdrawals. Accordingly, a permit applicant must demonstrate that the proposed use of the water:

(a) Is a reasonable and beneficial use...

(b) Will not interfere with any presently existing legal use of water; and

(c) Is consistent with the public interest.

In view of the strong opposition to the project raised at all levels of Florida government and considering the specific reference to "public interest" made in the draft EIS comment letter from the Florida Department of Administration, the ground water supply and quality question should be closely scrutinized.

Ground water quality may also be threatened through infiltration and recharge of process waters and slime pond leakage. The disposal of fluids, particularly those used in the flotation process, is an additional cause for concern.

Air Quality

Concern over air quality in the Osceola area is related to deterioration in existing air quality associated with concentrated mining and milling operations. Particulates may generate some cause for concern, and, as expressed in the EIS continual fluoride and sulfur

dioxide emissions can result in chronic effects upon long-term forest timber growth. Increased milling activity, either on- or off-site, may therefore produce regional detrimental effects.

Radiation

Significant redistribution of radioactive materials from the subsurface environment to the surface will take place as a result of the mining operations. Given the information contained in the EIS, it is not possible at this time to quantify the magnitude of the impacts to public health and the environment.

EPA is currently involved in a comprehensive investigation of the radiological impacts of phosphate mining and milling for the purpose of providing Federal standards and guidance. These standards, when issued, would apply to the Osceola project.

At this time, however, we are concerned with two considerations:

1. Radiological hazards to mine workers, and
2. Disposal of wastes containing radioactive materials.

Associated with the disposal of wastes, our concerns lie with the following:

1. Sealing slime ponds.
2. Removal of uranium from phosphoric acid.
3. Disposal of double liming sludge.
4. The contamination of drinking water.
5. Land reclamation and redistribution of radioactive materials, and
6. Stabilization of gypsum piles.

It may be possible adequately to mitigate the adverse impacts associated with the above activities through proper techniques and planning.

RECOMMENDATIONS

In light of the significant adverse environmental effects of phosphate mining in Osceola National Forest, EPA strongly recommends the leases be denied. While we recognize the significance of the phosphate deposit

in the Osceola National Forest in the sense that it constitutes a strategic reserve of a material that is essential to agriculture, we feel that a decision to issue mining leases at this time would be unwise based on the environmental issues raised herein and also in consideration of the "public interest" as expressed by the comments of State and private entities on the draft EIS. We favor, instead, setting aside these lands as a strategic phosphate reserve. Under this designation, phosphate mineral resources should be developed only in the event that the supply of phosphate becomes critical, and the supply of recoverable phosphates has been exhausted on private lands or lands on which the mining would have a lesser environmental impact or which can be more effectively reclaimed.

Additionally, in order to provide a national perspective within which rational decisions about committing environmentally valuable National Forest and other Federal lands to phosphate mining may be made, we strongly recommend the following course of action:

(1) A programmatic environmental impact statement assessing the overall impact of phosphate mining, processing, use and exportation should be prepared. This EIS would consider phosphate mining and reserves both on Federal lands and on private lands.

(2) Following the issuance of the EIS, a system of prioritization for development of phosphate mineral resources on Federal lands should be established which is consistent with the findings of the EIS. Such a system would take into account the availability of phosphate on private lands, and would allow for encouragement of mining in areas with most significant mineral values and least environmental risk.

(3) No additional phosphate leases should be issued for Federal lands pending the issuance of the EIS and subsequent findings.

(4) Consideration should be given towards establishing a program by which mineral inventory may be taken without mandatory commitment of the lands to subsequent development by the prospectors in areas having a demonstrated environmental, cultural, or esthetic significance.

Additional Study Needs

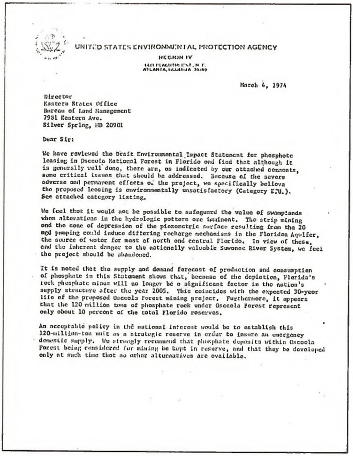
If, despite our recommendations, the decision is made that destruction of 28,000+ acres of the Osceola National Forest in favor of phosphate mining is required and the leases must be issued, we believe it is vital that the following measures pertain prior to the commencement of mining activities:

A. Pump tests should be performed to ascertain the radius of influence involved in withdrawing "make-up" waters from the Floridan aquifer. Particular attention should be given to the effects of drawdown upon water supply to Lake City, Florida, and to the potential for intrusion of salt water into the fresh water system.

B. An overall assessment should be made of the project's impact upon the watershed. For example, the effect of mining and reclamation upon runoff and infiltration, the likely recharge pathways to the Floridan aquifer, the effect of phosphate materials upon surface water, and the likelihood of interflow contributing to phosphate contamination of these surface waters are all areas that should be more closely determined. These studies should also be performed in recognition of the potential hazards arising from radiation contamination. The assessment should include a detailed survey using remote sensing, aerial photography, and geophysical instrumentation, as appropriate, to locate the significant karst features. Since active mining sites on adjacent private lands are, to an extent, a prototype, they should be first investigated as a preliminary determinant of the impacts expected in Osceola.

C. A monitoring network should be established to determine the effects of continuing mining upon water supply and quality. A similar network should be set up to assess changes in air quality.

D. The mining and reclamation plans for the entire project should be made public, and approval should be subject to review by concerned governmental agencies and individuals.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IV
1421 PEACHTREE ST., N.E.
ATLANTA, GEORGIA 30309

March 4, 1974

Director
Eastern States Office
Bureau of Land Management
7981 Eastern Ave.
Silver Spring, MD 20901

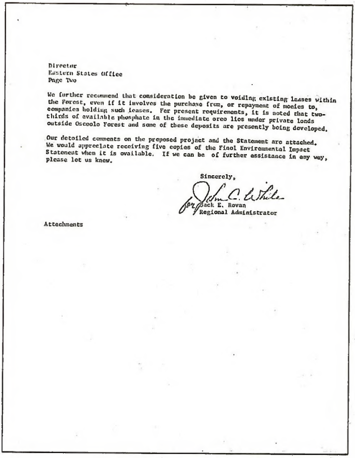
Dear Sir:

We have reviewed the Draft Environmental Impact Statement for phosphate leasing in Osceola National Forest in Florida and find that although it is generally well done, there are, as indicated by our attached comments, some critical issues that should be addressed. Because of the severe adverse and permanent effects of the project, we specifically believe the proposed leasing is environmentally unsatisfactory (Category E.U.). See attached category listing.

We feel that it would not be possible to safeguard the value of swamplands when alterations in the hydrologic pattern are imminent. The strip mining and the cone of depression of the piezometric surface resulting from the 20 mgd pumping could induce differing recharge mechanisms in the Floridan Aquifer, the source of water for most of north and central Florida. In view of these, and the inherent danger to the nationally valuable Suwanee River System, we feel the project should be abandoned.

It is noted that the supply and demand forecast of production and consumption of phosphate in this Statement shows that, because of the depletion, Florida's rock phosphate mines will no longer be a significant factor in the nation's supply structure after the year 2005. This coincides with the expected 30-year life of the proposed Osceola Forest mining project. Furthermore, it appears that the 120 million tons of phosphate rock under Osceola Forest represent only about 10 percent of the total Florida reserves.

An acceptable policy in the national interest would be to establish this 120-million-ton unit as a strategic reserve in order to insure an emergency domestic supply. We strongly recommend that phosphate deposits within Osceola Forest being considered for mining be kept in reserve, and that they be developed only at such time that no other alternatives are available.



Director
Eastern States Office
Page Two

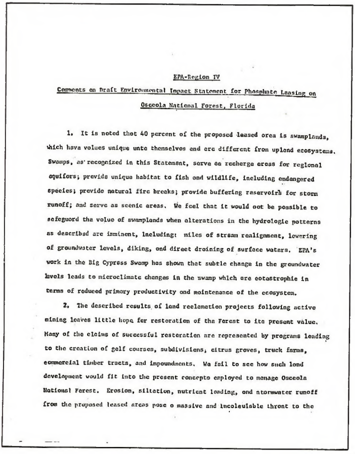
We further recommend that consideration be given to voiding existing leases within the Forest, even if it involves the purchase from, or repayment of monies to, companies holding such leases. For present requirements, it is noted that two-thirds of available phosphate in the immediate area lies under private lands outside Osceola Forest and some of these deposits are presently being developed.

Our detailed comments on the proposed project and the Statement are attached. We would appreciate receiving five copies of the Final Environmental Impact Statement when it is available. If we can be of further assistance in any way, please let us know.

Sincerely,

for John C. White
Jack E. Ravan
Regional Administrator

Attachments



EPA-Region IV

Comments on Draft Environmental Impact Statement for Phosphate Leasing on Osceola National Forest, Florida

1. It is noted that 40 percent of the proposed leased area is swamplands, which have values unique unto themselves and are different from upland ecosystems. Swamps, as recognized in this Statement, serve as recharge areas for regional aquifers; provide unique habitat to fish and wildlife, including endangered species; provide natural fire breaks; provide buffering reservoirs for storm runoff; and serve as scenic areas. We feel that it would not be possible to safeguard the value of swamplands when alterations in the hydrologic patterns as described are imminent, including: miles of stream realignment, lowering of groundwater levels, diking, and direct draining of surface waters. EPA's work in the Big Cypress Swamp has shown that subtle change in the groundwater levels leads to microclimate changes in the swamp which are catastrophic in terms of reduced primary productivity and maintenance of the ecosystem.

2. The described results of land reclamation projects following active mining leaves little hope for restoration of the Forest to its present value. Many of the claims of successful restoration are represented by programs leading to the creation of golf courses, subdivisions, citrus groves, truck farms, commercial timber tracts, and impoundments. We fail to see how such land development would fit into the present concepts employed to manage Osceola National Forest. Erosion, siltation, nutrient loading, and stormwater runoff from the proposed leased areas pose a massive and incalculable threat to the

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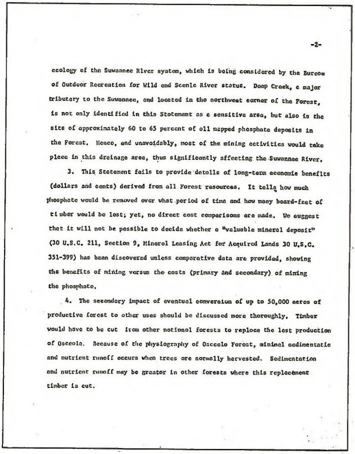

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ecology of the Suwannee River system, which is being considered by the Bureau of Outdoor Recreation for Wild and Scenic River status. Deep Creek, a major tributary to the Suwannee, and located in the northwest corner of the Forest, is not only identified in this Statement as a sensitive area, but also is the site of approximately 60 to 65 percent of all mapped phosphate deposits in the Forest. Hence, and unavoidably, most of the mining activities would take place in this drainage area, thus significantly affecting the Suwannee River.

3. This Statement fails to provide details of long-term economic benefits (dollars and cents) derived from all Forest resources. It tells how much phosphate would be removed over what period of time and how many board-feet of timber would be lost; yet, no direct cost comparisons are made. We suggest that it will not be possible to decide whether a "valuable mineral deposit" (30 U.S.C. 211, Section 9, Mineral Leasing Act for Acquired Lands 30 U.S.C. 351-399) has been discovered unless comparative data are provided, showing the benefits of mining versus the costs (primary and secondary) of mining the phosphate.

4. The secondary impact of eventual conversion of up to 50,000 acres of productive forest to other uses should be discussed more thoroughly. Timber would have to be cut from other national forests to replace the lost production of Osceola. Because of the physiography of Osceola Forest, minimal sedimentation and nutrient runoff occurs when trees are normally harvested. Sedimentation and nutrient runoff may be greater in other forests where this replacement timber is cut.

5. The effluent quality of water to be discharged from the wastewater treatment system for phosphate mining and processing should be established during permit issuance proceedings pursuant to Section 402 of the Federal Water Pollution Control Act Amendments of 1972. However, State certification must first be obtained in accordance with Section 401 of the Act and application must be made 180 days prior to making a discharge. The effluent standards must at least meet those set forth in the National Pollutant Discharge Elimination System guidelines or may be more stringent, depending upon the total load of the receiving stream and its ability to maintain water quality standards. Therefore, the parameters listed in Section 1 (page 67 of the Statement) involving the substances to be discharged from the wastewater treatment system should be based on the proposed rules and regulations published in the Federal Register of December 7, 1973 (Volume 38, Number 235, Part II) entitled "Effluent Limitations, Guidelines and New Source Performance Standards", Fertilizer Industry, Leather Tanning and Finishing Industry, Sugar Processing Industry. Part 418 of this publication covers the phosphate industry, and subparts 418.12 and 418.15 cover the effluent limitations.

6. The interrelationships and cumulative impacts of this proposed action and other related present or future mining on Federal lands are not adequately discussed. For example, no consideration is given to the potential environmental effects of shifting phosphate mining from Osceola Forest to the western Permian phosphate beds on Federal lands.

7. According to this Statement, the siltation rate for the Forest's undisturbed flatwoods areas is 0.01 tons per acre per year. But the overburden exposed through mining would be subject to sheet erosion at 111 tons per acre per year, an 11,000 percent increase in rate. The Statement goes on to say that the three miles of dikes constructed yearly in the mined area would expose 30 acres of overburden on their outer slopes, with an estimated 55 tons per acre, or 1,650 tons of sediment, could enter streams in the area from each unvegetated 30-acre exposure. If only a small fraction of this siltation occurs, the makeup of local stream life would be expected to be radically altered.

8. The proposed mining regime in Osceola Forest would reduce the area available for many types of recreational visits from nearby population centers.

9. According to this Statement, only phosphate mining will take place within the actual confines of Osceola National Forest. Chemical fertilizer processing, "slime pond" locations, gypsum disposal, and sulphuric acid manufacture will take place on private holdings juxtaposed to the Forest lands. Consequently, the only expected air pollution effects directly generated within the Forest confines will be the fugitive dust problem from the mined area itself, and from dirt roads, plus the automotive and other internal combustion engine emissions associated with the development of the mining industry.

It must be pointed out that emissions from the industrial plants would have an effect on the ambient air over the Forest. The sulphuric acid production unit would have to meet the Standards of Performance for New Stationary Sources as outlined in Subpart H of the Federal Register of December 23, 1971 (Volume 36, Number 247). These standards restrict the quantities of sulphur dioxide and acid mist that may be emitted by the plant. However, to the extent that the emission plumes penetrate the Osceola Forest airspace, the ambient air quality therein would be degraded as to sulphur dioxide and acid mist content. If fossil fuel is used to supply the heat in the rock dryer (the Statement is silent on the heat source) its emissions, although controlled by these standards required by the Florida Process Weight Table, would add to the burden of potential air pollutants in the Forest. This potential impact should be defined.

At the time these comments were prepared, EPA had not promulgated new Source Performance Standards for phosphate fertilizer chemical processing plants. A recognized hazard and one that will be addressed in the standards when promulgated, are flouride emissions. A limitation of the number of pounds, or f .ion thereof, of flourides which may be emitted per ton of phosphorus pent .de processed, is being considered on wet processing, granular triple supe hosphate, run of pile triple superphosphate manufacture and storage, and superphosphation. Flourine and its compounds introduced into the Forest through the air would have an affect as noted in the foregoing comments applying to suplhur dioxide and acid mist emissions.

10. A more thorough examination needs to be made of the effect of flourides which would be deposited within the Forest from the mining and processing operations. Flouride effects on food chain and nutrient recycling in the Forest ecosystem should also be investigated. Some form of control on the volitile flourides which vaporize from the various types of active and abandoned storage ponds formed through the phosphate mining process may be necessary to prevent concentration of flouride in leaf tissues of forest plants.

11. This Statement does not address the question of how much of the 20 mgd makeup water will run off from the mining area. Any significant runoff would provide ready transport for waterborne pollutants to the Suwannee River. It should be noted that normal streamflow in the area is extremely variable. Hurricanes and prolonged droughts cause local streams to flood periodically or wane. Therefore, maintenance of a normal flow regime would be important to the biota which naturally are adapted to presently existing conditions. These conditions must be considered when planning activities which would alter the landscape and change runoff distribution. A direct effect of the mining would be the alteration of the vadose water quality and quantity. The strip mining, plus the cone of depression resultant from the 20 mgd pumping, could induce differing recharge mechanisms in the Floridan Aquifer, the source of water for most of north and central Florida. (Nearby, a municipality, Lake City, a town of 16,000, uses less than one-tenth this quantity of water and has had to drill five wells in order to insure its supply.)

12. During the 30-year active mining period, tropical storms accompanied by intense rainfall could be expected to pass over the Forest. All retention ponds, dikes, ditches, berms, and dams would have to be constructed in such manne as to survive severe weather conditions, especially hurricanes. After the 30-year active mining period expires, all retention facilities would have to be permanently stabilized and regularly inspected in perpetuity to avoid future spil

13. According to this Statement, about 400,000,000 kilowatt hours per year of electricity would be needed for proposed mining activities. The generation of this annual quantity of electricity could require about 80,000 metric tons of coal or 300,000 barrels of oil. The consumption of these

non-renewable resources would produce solid and gaseous products in the following approximate minimum amounts:

Substance	Coal Fired Plant	Oil Fired Plant
	Metric Tons Per Year	
SO_2	1,478	987
NO_x	850	375
Particulates	125	125
Ash	9,375	987

Control, treatment, ultimate disposal, and environmental effects of the foregoing products are significant secondary effects of the proposed mining and should be addressed.

14. The Section "After Mining" (page III-9) should be discussed more fully. For example, in paragraph 3, it is stated that "infiltration of rainwater would be slow because the surface of the reclaimed material would consist of a mass of structureless material high in clay content." However, if the overburden is removed in two stages, which could be easily done, and the organic and sandy soils replaced on the land surface, the after mining soil conditions would be more similar to the original conditions without the decrease in the percolation rate described.

15. We feel the description of the environmental effects of the exploration phase of the operation is incomplete and inadequate. Roads will need to be built, drill sites cleared, and, in swampy areas, drill work pads would be built with fill material. These factors should be addressed.

16. More modern practices and approaches have been developed for reclaiming strip mined areas than those described in the Section, "Mining." We recommend more research and rewriting of this Section. (See EPA's Publication 430/9-73-011 "Process, Procedures, and Methods to Control Pollution From Mining Activities" and its list of 125 references.)

17. Sufficient data should be available on increases in the nitrogen and phosphate content in ponds on strip mined property in Florida to predict the levels that could be expected at the proposed site. Therefore, we suggest avoidance of such statements as on page III-4: "Static or ponded water areas would increase slightly in total phosphate . . .". Phrases such as "increase slightly" should be replaced with facts and figures, attainable from the Florida Department of Pollution Control files on the subject.

18. On page III-21 (paragraph 2), explanation should be given as to whether the effects of created lakes are expected to be adverse or beneficial to the Floridan Aquifer. Water quality data for each aquifer and for the phosphate ponds are available from the U.S. Geological Survey and other Department of the Interior files in Florida. We recommend use of these data to predict water quality changes.

19. Figure 24 does not show the aquifer recharge status of Osceola Forest. Data in this Statement suggest that because of the relationship between the land elevation and piezometric surface existing in the proposed mining area, significant aquifer recharge occurs there. Flow lines would aid in the interpretation of this figure.

20. On page IV-7, we suggest that the approach on development and utilization of the water resources for artificial recharge be expanded.

21. In Section VII-B, we suggest the listing of canals, since they constitute major land form changes.

22. This Statement comments that if phosphate mining is curtailed, exports will be limited, consequently adversely affecting our balance of trade. We suggest that the availability of other sites where phosphate mining could take place without significant environmental damage should be examined. Utilization of these areas could well make up for limitation on mining in Osceola Forest.

23. This Statement should address the potential problem of increases in the ambient radiation level produced by mining phosphate rock in terms of environmental impact and population exposure. Phosphate rock contains uranium in equilibrium, but once this equilibrium is disturbed by mining, radium and radon are released and may increase the environmental radiation level significa In other locations in Florida where similar operations have occurred, radiation dose rates have escalated from 2 microroentgens/hour prior to rock removals to as much as 100 microroentgens/hour as mining progresses. Specific comments in this area of concern are as follows:

a. Page I-23. The mining of 4 million tons/year (120 million tons total) would expose 217 tons of natural uranium and 3.6 curies of radium to the environment each year, or a total of 6,500 tons (page VII-1) of uranium and 108 curies of radium. Under present technology, virtually all the uranium would be carried with the fertilizer and be spread on the nation's fields, whi the radium would be in the liquid and solid wastes from the acidulation step. Technology exists for recovery of uranium from the fertilizer, but not the radium.

b. Page I-45. The problem with mixing slimes with sand tailings for reclamation is that the slimes contain virtually the same radium concentration (50 pci/g) as the matrix. When this material is spread on the land surface, above the water table, the result is increased radon decay product concentration at the surface, increasing the hazard for use of the land for housing.

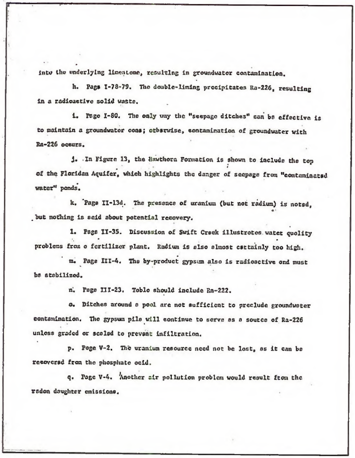
c. Page I-48. Calcining of phosphate rock liberates the radon decay products contained in the rock. A study is now under way by EPA (NERC, Las Vegas) as to the hazard. In one case, background polonium-210 concentrations in the air were increased 15 times as a result of a small calcining operation. This is counter to FRC (Federal Radiation Council) policy.

d. Page I-52. The acidulation step is the site of a major partioning: virtually all the uranium is carried with the fertilizer, while the radium precipitates with the by-product gypsum. Two plants are now building uranium-recovery circuits to capture this increasingly scarce commodity. Gypsum is too high in Ra-226 for any use and must be stabilized to prevent erosion or leaching.

e. Page I-85. Triple superphosphate does not involve gypsum removal; hence, the TSP has all the incoming Ra-226.

f. Page I-59. In regard to slimes, see comment b. Failure of slime ponds (a major occurrence) results in a massive release of leachable Ra-226 to the surface water.

g. Page I-64. The "contaminated water" is high in Ra-226 (100 pci/l or 30 times the maximum permissible concentration). The proposed "best practical control technology currently available" is "double-liming" which does remove Ra-226. Major problems exist where the highly-acid "contaminated water" seeps



into the underlying limestone, resulting in groundwater contamination.

h. Page I-78-79. The double-liming precipitates Ra-226, resulting in a radioactive solid waste.

i. Page I-80. The only way the "seepage ditches" can be effective is to maintain a groundwater cone; otherwise, contamination of groundwater with Ra-226 occurs.

j. In Figure 13, the Hawthorn Formation is shown to include the top of the Floridan Aquifer, which highlights the danger of seepage from "contaminated water" ponds.

k. Page II-13d. The presence of uranium (but not radium) is noted, but nothing is said about potential recovery.

l. Page II-35. Discussion of Swift Creek illustrates water quality problems from a fertilizer plant. Radium is also almost certainly too high.

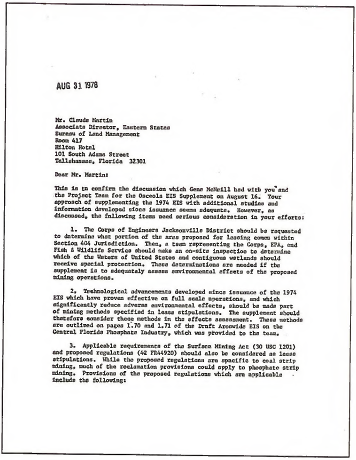
m. Page III-4. The by-product gypsum also is radioactive and must be stabilized.

n. Page III-23. Table should include Rn-222.

o. Ditches around a pool are not sufficient to preclude groundwater contamination. The gypsum pile will continue to serve as a source of Ra-226 unless graded or sealed to prevent infiltration.

p. Page V-2. The uranium resource need not be lost, as it can be recovered from the phosphate acid.

q. Page V-4. Another air pollution problem would result from the radon daughter emissions.



AUG 31 1978

Mr. Claude Martin
Associate Director, Eastern States
Bureau of Land Management
Room 417
Hilton Hotel
101 South Adams Street
Tallahassee, Florida 32301

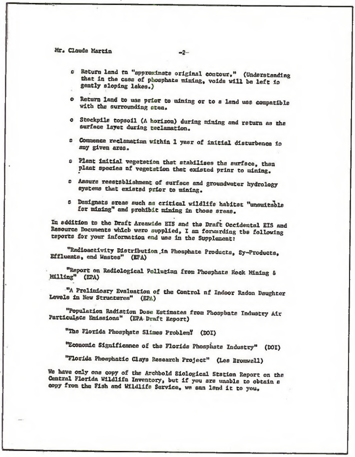
Dear Mr. Martin:

This is to confirm the discussion which Gene McNeill had with you and the Project Team for the Osceola EIS Supplement on August 16. Your approach of supplementing the 1974 EIS with additional studies and information developed since issuance seems adequate. However, as discussed, the following items need serious consideration in your efforts:

1. The Corps of Engineers Jacksonville District should be requested to determine what portion of the area proposed for leasing comes within Section 404 Jurisdiction. Then, a team representing the Corps, EPA, and Fish & Wildlife Service should make an on-site inspection to determine which of the Waters of United States and contiguous wetlands should receive special protection. These determinations are needed if the supplement is to adequately assess environmental effects of the proposed mining operations.

2. Technological advancements developed since issuance of the 1974 EIS which have proven effective on full scale operations, and which significantly reduce adverse environmental effects, should be made part of mining methods specified in lease stipulations. The supplement should therefore consider these methods in the effects assessment. These methods are outlined on pages 1.70 and 1.71 of the Draft Areawide EIS on the Central Florida Phosphate Industry, which was provided to the team.

3. Applicable requirements of the Surface Mining Act (30 USC 1201) and proposed regulations (42 FR44920) should also be considered as lease stipulations. While the proposed regulations are specific to coal strip mining, much of the reclamation provisions could apply to phosphate strip mining. Provisions of the proposed regulations which are applicable include the following:



Mr. Claude Martin -2-

- Return land to "approximate original contour." (Understanding that in the case of phosphate mining, voids will be left in gently sloping lakes.)
- Return land to use prior to mining or to a land use compatible with the surrounding area.
- Stockpile topsoil (A horizon) during mining and return as the surface layer during reclamation.
- Commence reclamation within 1 year of initial disturbance in any given area.
- Plant initial vegetation that stabilises the surface, then plant species of vegetation that existed prior to mining.
- Assure reestablishment of surface and groundwater hydrology systems that existed prior to mining.
- Designate areas such as critical wildlife habitat "unsuitable for mining" and prohibit mining in those areas.

In addition to the Draft Areawide EIS and the Draft Occidental EIS and Resource Documents which were supplied, I am forwarding the following reports for your information and use in the Supplement:

"Radioactivity Distribution in Phosphate Products, By-Products, Effluents, and Wastes" (EPA)

"Report on Radiological Pollution from Phosphate Rock Mining & Milling" (EPA)

"A Preliminary Evaluation of the Control of Indoor Radon Daughter Levels in New Structures" (EPA)

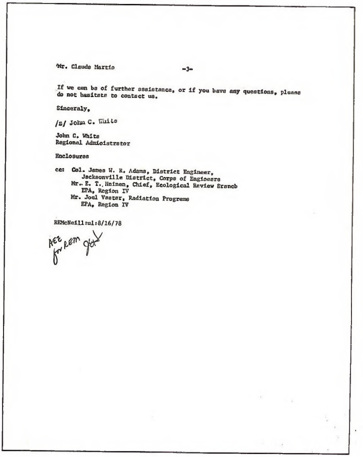
"Population Radiation Dose Estimates from Phosphate Industry Air Particulate Emissions" (EPA Draft Report)

"The Florida Phosphate Slimes Problem" (DOI)

"Economic Significance of the Florida Phosphate Industry" (DOI)

"Florida Phosphatic Clays Research Project" (Les Bromwell)

We have only one copy of the Archbold Biological Station Report on the Central Florida Wildlife Inventory, but if you are unable to obtain a copy from the Fish and Wildlife Service, we can lend it to you.



Mr. Claude Martin -3-

If we can be of further assistance, or if you have any questions, please do not hesitate to contact us.

Sincerely,

/s/ John C. White

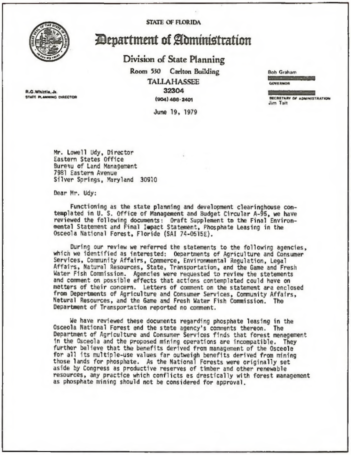
John C. White
Regional Administrator

Enclosures

cc: Col. James W. R. Adams, District Engineer,
Jacksonville District, Corps of Engineers
Mr. E. T. Hainen, Chief, Ecological Review Branch
EPA, Region IV
Mr. Joel Vaster, Radiation Programs
EPA, Region IV

REMcNeill:ml:8/16/78

AEZ for REM



STATE OF FLORIDA

Department of Administration

Division of State Planning

Room 530 Carlton Building
TALLAHASSEE
32304
(904) 488-2401

R.G.Whittle, Jr.
STATE PLANNING DIRECTOR

Bob Graham
[redacted]
GOVERNOR

[redacted]
SECRETARY OF ADMINISTRATION
Jim Tait

June 19, 1979

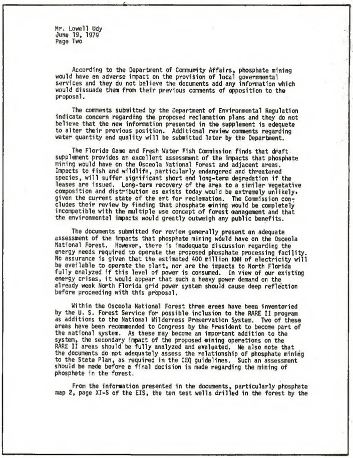
Mr. Lowell Udy, Director
Eastern States Office
Bureau of Land Management
7981 Eastern Avenue
Silver Springs, Maryland 30910

Dear Mr. Udy:

Functioning as the state planning and development clearinghouse contemplated in U. S. Office of Management and Budget Circular A-95, we have reviewed the following documents: Draft Supplement to the Final Environmental Statement and Final Impact Statement, Phosphate Leasing in the Osceola National Forest, Florida (SAI 74-0515E).

During our review we referred the statements to the following agencies, which we identified as interested: Departments of Agriculture and Consumer Services, Community Affairs, Commerce, Environmental Regulation, Legal Affairs, Natural Resources, State, Transportation, and the Game and Fresh Water Fish Commission. Agencies were requested to review the statements and comment on possible effects that actions contemplated could have on matters of their concern. Letters of comment on the statement are enclosed from Departments of Agriculture and Consumer Services, Community Affairs, Natural Resources, and the Game and Fresh Water Fish Commission. The Department of Transportation reported no comment.

We have reviewed these documents regarding phosphate leasing in the Osceola National Forest and the state agency's comments thereon. The Department of Agriculture and Consumer Services finds that forest management in the Osceola and the proposed mining operations are incompatible. They further believe that the benefits derived from management of the Osceola for all its multiple-use values far outweigh benefits derived from mining those lands for phosphate. As the National Forests were originally set aside by Congress as productive reserves of timber and other renewable resources, any practice which conflicts as drastically with forest management as phosphate mining should not be considered for approval.



Mr. Lowell Udy
June 19, 1979
Page Two

According to the Department of Community Affairs, phosphate mining would have an adverse impact on the provision of local governmental services and they do not believe the documents add any information which would dissuade them from their previous comments of opposition to the proposal.

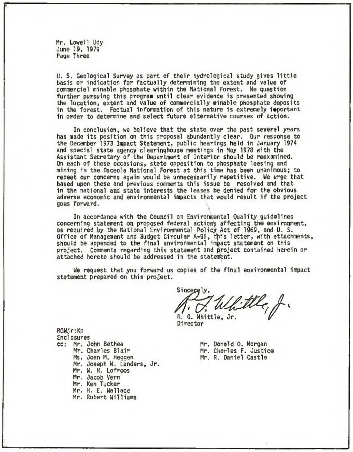
The comments submitted by the Department of Environmental Regulation indicate concern regarding the proposed reclamation plans and they do not believe that the new information presented in the supplement is adequate to alter their previous position. Additional review comments regarding water quantity and quality will be submitted later by the Department.

The Florida Game and Fresh Water Fish Commission finds that draft supplement provides an excellent assessment of the impacts that phosphate mining would have on the Osceola National Forest and adjacent areas. Impacts to fish and wildlife, particularly endangered and threatened species, will suffer significant short and long-term degradation if the leases are issued. Long-term recovery of the area to a similar vegetative composition and distribution as exists today would be extremely unlikely, given the current state of the art for reclamation. The Commission concludes their review by finding that phosphate mining would be completely incompatible with the multiple use concept of forest management and that the environmental impacts would greatly outweigh any public benefits.

The documents submitted for review generally present an adequate assessment of the impacts that phosphate mining would have on the Osceola National Forest. However, there is inadequate discussion regarding the energy needs required to operate the proposed phosphate processing facility. No assurance is given that the estimated 400 million KWH of electricity will be available to operate the plant, nor are the impacts to North Florida fully analyzed if this level of power is consumed. In view of our existing energy crises, it would appear that such a heavy power demand on the already weak North Florida grid power system should cause deep reflection before proceeding with this proposal.

Within the Osceola National Forest three areas have been inventoried by the U. S. Forest Service for possible inclusion to the RARE II program as additions to the National Wilderness Preservation System. Two of these areas have been recommended to Congress by the President to become part of the national system. As these may become an important addition to the system, the secondary impact of the proposed mining operations on the RARE II areas should be fully analyzed and evaluated. We also note that the documents do not adequately assess the relationship of phosphate mining to the State Plan, as required in the CEQ guidelines. Such an assessment should be made before a final decision is made regarding the mining of phosphate in the forest.

From the information presented in the documents, particularly phosphate map 2, page XI-S of the EIS, the ten test wells drilled in the forest by the



Mr. Lowell Udy
June 19, 1979
Page Three

U. S. Geological Survey as part of their hydrological study gives little basis or indication for factually determining the extent and value of commercial minable phosphate within the National Forest. We question further pursuing this program until clear evidence is presented showing the location, extent and value of commercially minable phosphate deposits in the forest. Factual information of this nature is extremely important in order to determine and select future alternative courses of action.

In conclusion, we believe that the state over the past several years has made its position on this proposal abundantly clear. Our response to the December 1973 Impact Statement, public hearings held in January 1974 and special state agency clearinghouse meetings in May 1978 with the Assistant Secretary of the Department of Interior should be reexamined. On each of these occasions, state opposition to phosphate leasing and mining in the Osceola National Forest at this time has been unanimous; to repeat our concerns again would be unnecessarily repetitive. We urge that based upon these and previous comments this issue be resolved and that in the national and state interests the leases be denied for the obvious adverse economic and environmental impacts that would result if the project goes forward.

In accordance with the Council on Environmental Quality guidelines concerning statement on proposed federal actions affecting the environment, as required by the National Environmental Policy Act of 1969, and U. S. Office of Management and Budget Circular A-95, this letter, with attachments, should be appended to the final environmental impact statement on this project. Comments regarding this statement and project contained herein or attached hereto should be addressed in the statement.

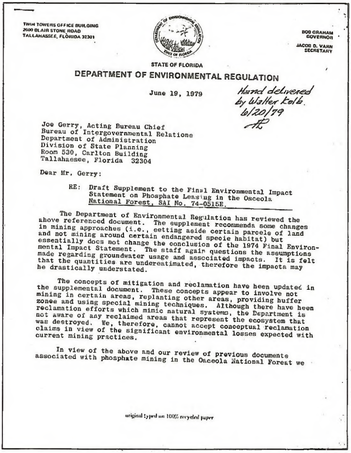
We request that you forward us copies of the final environmental impact statement prepared on this project.

Sincerely,

R. G. Whittle, Jr.

R. G. Whittle, Jr.
Director

RGWjr:Kp
Enclosures
cc: Mr. John Bethea
Mr. Charles Blair
Ms. Joan M. Heggen
Mr. Joseph W. Landers, Jr.
Mr. W. N. Lofroos
Mr. Jacob Vern
Mr. Ken Tucker
Mr. H. E. Wallace
Mr. Robert Williams
Mr. Donald O. Morgan
Mr. Charles F. Justice
Mr. R. Daniel Castle



TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301

BOB GRAHAM
GOVERNOR

JACOB D. VARN
SECRETARY

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

June 19, 1979

Hand delivered
by Walter Kolb.
6/20/79

Joe Gerry, Acting Bureau Chief
Bureau of Intergovernmental Relations
Department of Administration
Division of State Planning
Room 530, Carlton Building
Tallahassee, Florida 32304

Dear Mr. Gerry:

RE: Draft Supplement to the Final Environmental Impact Statement on Phosphate Leasing in the Osceola National Forest, SAI No. 74-0515E.

The Department of Environmental Regulation has reviewed the above referenced document. The supplement recommends some changes in mining approaches (i.e., setting aside certain parcels of land and not mining around certain endangered specie habitat) but essentially does not change the conclusion of the 1974 Final Environmental Impact Statement. The staff again questions the assumptions made regarding groundwater usage and associated impacts. It is felt that the quantities are underestimated, therefore the impacts may be drastically understated.

The concepts of mitigation and reclamation have been updated in the supplemental document. These concepts appear to involve not mining in certain areas, replanting other areas, providing buffer zones and using special mining techniques. Although there have been reclamation efforts which mimic natural systems, the Department is not aware of any reclaimed areas that represent the ecosystem that was destroyed. We, therefore, cannot accept conceptual reclamation claims in view of the significant environmental losses expected with current mining practices.

In view of the above and our review of previous documents associated with phosphate mining in the Osceola National Forest we

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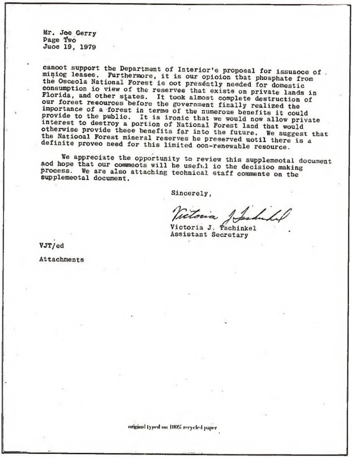

Mr. Joe Gerry
Page Two
June 19, 1979

cannot support the Department of Interior's proposal for issuance of mining leases. Furthermore, it is our opinion that phosphate from the Osceola National Forest is not presently needed for domestic consumption in view of the reserves that exists on private lands in Florida, and other states. It took almost complete destruction of our forest resources before the government finally realized the importance of a forest in terms of the numerous benefits it could provide to the public. It is ironic that we would now allow private interest to destroy a portion of National Forest land that would otherwise provide these benefits far into the future. We suggest that the National Forest mineral reserves be preserved until there is a definite proven need for this limited non-renewable resource.

We appreciate the opportunity to review this supplemental document and hope that our comments will be useful in the decision making process. We are also attaching technical staff comments on the supplemental document.

Sincerely,

Victoria J Tschinkel
Victoria J. Tschinkel
Assistant Secretary

VJT/ed

Attachments

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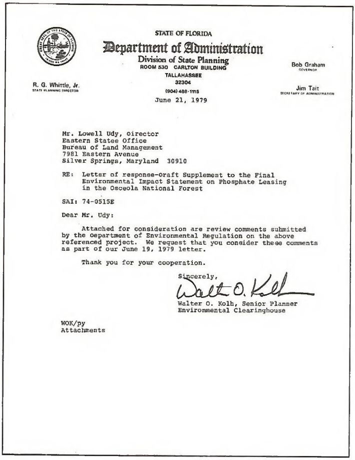

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(904) 488-1115

R. G. Whittle, Jr.
STATE PLANNING DIRECTOR

Bob Graham
GOVERNOR

Jim Tait
SECRETARY OF ADMINISTRATION

June 21, 1979

Mr. Lowell Udy, Director
Eastern States Office
Bureau of Land Management
7981 Eastern Avenue
Silver Springs, Maryland 30910

RE: Letter of response-Draft Supplement to the Final Environmental Impact Statement on Phosphate Leasing in the Osceola National Forest

SAI: 74-0515E

Dear Mr. Udy:

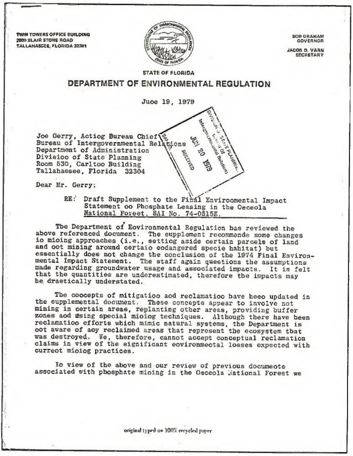
Attached for consideration are review comments submitted by the Department of Environmental Regulation on the above referenced project. We request that you consider these comments as part of our June 19, 1979 letter.

Thank you for your cooperation.

Sincerely,

Walt O. Kolh
Walter O. Kolh, Senior Planner
Environmental Clearinghouse

WOK/py
Attachments



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BOB GRAHAM
GOVERNOR

JACOB D. VARN
SECRETARY

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

June 19, 1979

Joe Gerry, Acting Bureau Chief
Bureau of Intergovernmental Relations
Department of Administration
Division of State Planning
Room 530, Carlton Building
Tallahassee, Florida 32304

DIVISION OF STATE PLANNING
Bureau of
Intergovernmental Relations
JUN 20 1979
RECEIVED
SAI NO.

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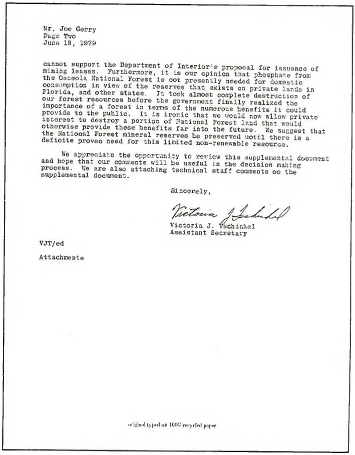

Mr. Joe Gerry
Page Two
June 19, 1979

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We appreciate the opportunity to review this supplemental document and hope that our comments will be useful in the decision making process. We are also attaching technical staff comments on the supplemental document.

Sincerely,

Victoria J Tschinkel
Victoria J. Tschinkel
Assistant Secretary

VJT/ed

Attachments

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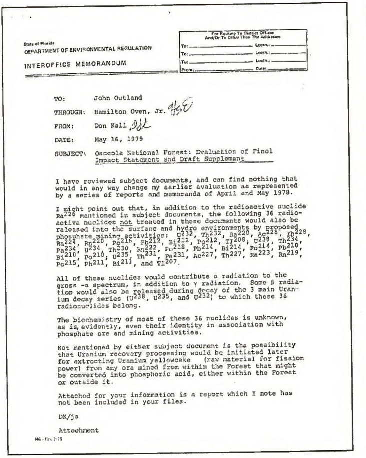


State of Florida
DEPARTMENT OF ENVIRONMENTAL REGULATION

INTEROFFICE MEMORANDUM

For Routing To District Offices
And/Or To Other Than The Addressee
To: ______ Locn.: ______
To: ______ Locn.: ______
To: ______ Locn.: ______
From: ______ Date: ______

TO: John Outland

THROUGH: Hamilton Oven, Jr. HSO

FROM: Don Kall DJK

DATE: May 16, 1979

SUBJECT: Osceola National Forest: Evaluation of Final Impact Statement and Draft Supplement

I have reviewed subject documents, and can find nothing that would in any way change my earlier evaluation as represented by a series of reports and memoranda of April and May 1978.

I might point out that, in addition to the radioactive nuclide Ra^{226} mentioned in subject documents, the following 36 radioactive nuclides not treated in these documents would also be released into the surface and hydro environments by proposed phosphate mining activities: U^{232}, Th^{232}, Ra^{228}, Ac^{228}, Th^{228}, Ra^{224}, Rn^{220}, Po^{216}, Pb^{212}, Bi^{212}, Po^{212}, Tl^{208}; U^{238}, Th^{234}, Pa^{234}, U^{234}, Th^{230}, Rn^{222}, Po^{218}, Pb^{214}, Bi^{214}, Po^{214}, Pb^{210}, Bi^{210}, Po^{210}; U^{235}, Th^{231}, Pa^{231}, Ac^{227}, Th^{227}, Ra^{223}, Rn^{219}, Po^{215}, Pb^{211}, Bi^{211}, and Tl^{207}.

All of these nuclides would contribute α radiation to the gross -α spectrum, in addition to γ radiation. Some β radiation would also be released during decay of the 3 main Uranium decay series (U^{238}, U^{235}, and U^{232}) to which these 36 radionuclides belong.

The biochemistry of most of these 36 nuclides is unknown, as is, evidently, even their identity in association with phosphate ore and mining activities.

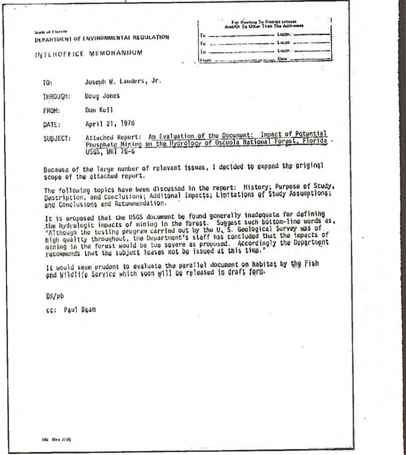
Not mentioned by either subject document is the possibility that Uranium recovery processing would be initiated later for extracting Uranium yellowcake (raw material for fission power) from any ore mined from within the Forest that might be converted into phosphoric acid, either within the Forest or outside it.

Attached for your information is a report which I note has not been included in your files.

DK/ja

Attachment

H6 - Rev 2/76



State of Florida
DEPARTMENT OF ENVIRONMENTAL REGULATION

INTEROFFICE MEMORANDUM

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To ______ Locn.: ______
To ______ Locn.: ______
To ______ Locn.: ______
From: ______ Date: ______

TO: Joseph W. Landers, Jr.

THROUGH: Doug Jones

FROM: Don Kell

DATE: April 21, 1978

SUBJECT: Attached Report: An Evaluation of the Document: Impact of Potential Phosphate Mining on the Hydrology of Osceola National Forest, Florida. USGS, WRI 78-6

Because of the large number of relevant issues, I decided to expand the original scope of the attached report.

The following topics have been discussed in the report: History; Purpose of Study, Description, and Conclusions; Additonal Impacts; Limitations of Study Assumptions; and Conclusions and Recommendation.

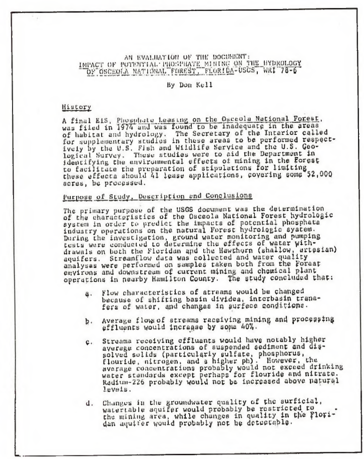
It is proposed that the USGS document be found generally inadequate for defining the hydrologic impacts of mining in the forest. Suggest such bottom-line words as, "Although the testing program carried out by the U. S. Geological Survey was of high quality throughout, the Department's staff has concluded that the impacts of mining in the forest would be too severe as proposed. Accordingly the Department recommends that the subject leases not be issued at this time."

It would seem prudent to evaluate the parallel document on habitat by the Fish and Wildlife Service which soon will be released in draft form.

DK/pb

cc: Paul Beam

H6 Rev 7/76



AN EVALUATION OF THE DOCUMENT: IMPACT OF POTENTIAL PHOSPHATE MINING ON THE HYDROLOGY OF OSCEOLA NATIONAL FOREST, FLORIDA-USGS, WRI 78-6

By Don Kell

History

A final EIS, Phosphate Leasing on the Osceola National Forest, was filed in 1974 and was found to be inadequate in the areas of habitat and hydrology. The Secretary of the Interior called for supplementary studies in these areas to be performed respectively by the U.S. Fish and Wildlife Service and the U.S. Geological Survey. These studies were to aid the Department in identifying the environmental effects of mining in the Forest to facilitate the preparation of stipulations for limiting these effects should 41 lease applications, covering some 52,000 acres, be processed.

Purpose of Study, Description and Conclusions

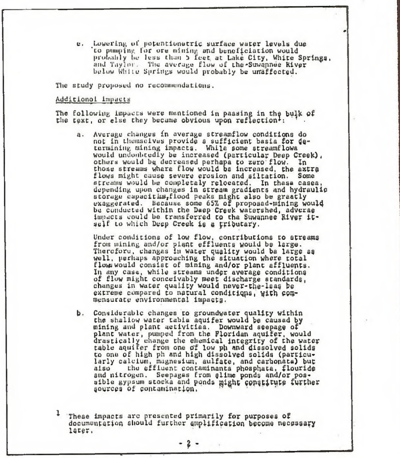
The primary purpose of the USGS document was the determination of the characteristics of the Osceola National Forest hydrologic system in order to predict the impacts of potential phosphate industry operations on the natural Forest hydrologic system. During the investigation, ground water monitoring and pumping tests were conducted to determine the effects of water withdrawals on both the Floridan and the Hawthorn (shallow, artesian) aquifers. Streamflow data was collected and water quality analyses were performed on samples taken both from the Forest environs and downstream of current mining and chemical plant operations in nearby Hamilton County. The study concluded that:

a. Flow characteristics of streams would be changed because of shifting basin divides, interbasin transfers of water, and changes in surface conditions.

b. Average flows of streams receiving mining and processing effluents would increase by some 40%.

c. Streams receiving effluents would have notably higher average concentrations of suspended sediment and dissolved solids (particularly sulfate, phosphorus, flouride, nitrogen, and a higher ph). However, the average concentrations probably would not exceed drinking water standards except perhaps for flouride and nitrate. Radium-226 probably would not be increased above natural levels.

d. Changes in the groundwater quality of the surficial, watertable aquifer would probably be restricted to the mining area, while changes in quality in the Floridan aquifer would probably not be detectable.



e. Lowering of potentiometric surface water levels due to pumping for ore mining and beneficiation would probably be less than 5 feet at Lake City, White Springs, and Taylor. The average flow of the Suwannee River below White Springs would probably be unaffected.

The study proposed no recommendations.

Additional Impacts

The following impacts were mentioned in passing in the bulk of the text, or else they became obvious upon reflection[1]:

a. Average changes in average streamflow conditions do not in themselves provide a sufficient basis for determining mining impacts. While some streamflows would undoubtedly be increased (particular Deep Creek), others would be decreased perhaps to zero flow. In those streams where flow would be increased, the extra flows might cause severe erosion and siltation. Some streams would be completely relocated. In these cases, depending upon changes in stream gradients and hydraulic storage capacities, flood peaks might also be greatly exaggerated. Because some 65% of proposed-mining would be conducted within the Deep Creek watershed, adverse impacts could be transferred to the Suwannee River itself to which Deep Creek is a tributary.

   Under conditions of low flow, contributions to streams from mining and/or plant effluents would be large. Therefore, changes in water quality would be large as well, perhaps approaching the situation where total flows would consist of mining and/or plant effluents. In any case, while streams under average conditions of flow might conceivably meet discharge standards, changes in water quality would never-the-less be extreme compared to natural conditions, with commensurate environmental impacts.

b. Considerable changes to groundwater quality within the shallow water table aquifer would be caused by mining and plant activities. Downward seepage of plant water, pumped from the Floridan aquifer, would drastically change the chemical integrity of the water table aquifer from one of low ph and dissolved solids to one of high ph and high dissolved solids (particularly calcium, magnesium, sulfate, and carbonate) but also the effluent contaminants phosphate, flouride and nitrogen. Seepages from slime ponds and/or possible gypsum stocks and ponds might constitute further sources of contamination.

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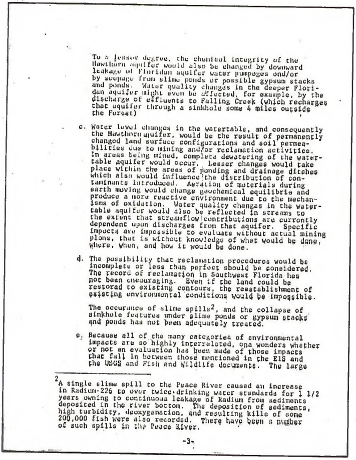
[1] These impacts are presented primarily for purposes of documentation should further amplification become necessary later.



To a lesser degree, the chemical integrity of the Hawthorn aquifer would also be changed by downward leakage of Floridan aquifer water pumpages and/or by seepage from slime ponds or possible gypsum stacks and ponds. Water quality changes in the deeper Floridan aquifer might even be affected, for example, by the discharge of effluents to Falling Creek (which recharges that aquifer through a sinkhole some 4 miles outside the Forest)

c. Water level changes in the watertable, and consequently the Hawthorn aquifer, would be the result of permanently changed land surface configurations and soil permeabilities due to mining and/or reclamation activities. In areas being mined, complete dewatering of the watertable aquifer would occur. Lesser changes would take place within the areas of ponding and drainage ditches which also would influence the distribution of contaminants introduced. Aeration of materials during earth moving would change geochemical equilibria and produce a more reactive environment due to the mechanisms of oxidation. Water quality changes in the watertable aquifer would also be reflected in streams to the extent that streamflow contributions are currently dependent upon discharges from that aquifer. Specific impacts are impossible to evaluate without actual mining plans, that is without knowledge of what would be done, where, when, and how it would be done.

d. The possibility that reclamation procedures would be incomplete or less than perfect should be considered. The record of reclamation in Southwest Florida has not been encouraging. Even if the land could be restored to existing contours, the reestablishment of existing environmental conditions would be impossible.

The occurance of slime spills[2], and the collapse of sinkhole features under slime ponds or gypsum stacks and ponds has not been adequately treated.

e. Because all of the many categories of environmental impacts are so highly interrelated, one wonders whether or not an evaluation has been made of those impacts that fall in between those mentioned in the EIS and the USGS and Fish and Wildlife documents. The large

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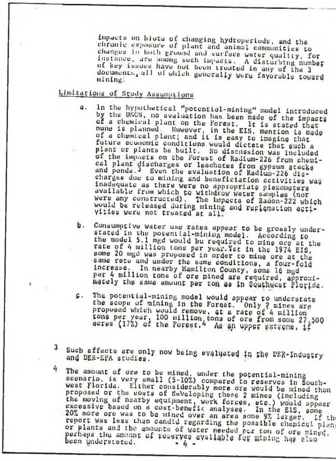
[2] A single slime spill to the Peace River caused an increase in Radium-226 to over twice drinking water standards for 1 1/2 years owning to continuous leakage of Radium from sediments deposited in the river bottom. The deposition of sediments, high turbidity, deoxygenation, and resulting kills of some 200,000 fish were also recorded. There have been a number of such spills in the Peace River.



impacts on biota of changing hydroperiods, and the chronic exposure of plant and animal communities to changes in both ground and surface water quality, for instance, are among such impacts. A disturbing number of key issues have not been treated in any of the 3 documents, all of which generally were favorable toward mining.

Limitations of Study Assumptions

a. In the hypothetical "potential-mining" model introduced by the USGS, no evaluation has been made of the impacts of a chemical plant on the Forest. It is stated that none is planned. However, in the EIS, mention is made of a chemical plant; and it is easy to imagine that future economic conditions would dictate that such a plant or plants be built. No discussion was included of the impacts on the Forest of Radium-226 from chemical plant discharges or leachates from gypsum stacks and ponds.[3] Even the evaluation of Radium-226 discharges due to mining and beneficiation activities was inadequate as there were no appropriate piezometers available from which to withdraw water samples (nor were any constructed). The impacts of Radon-222 which would be released during mining and reclamation activities were not treated at all.

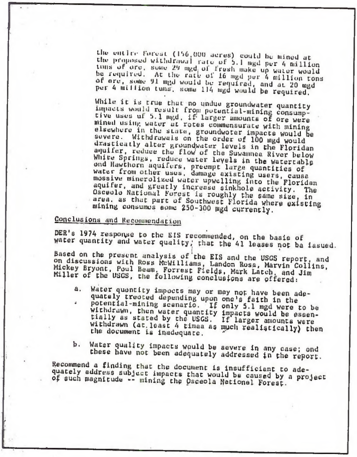
b. Consumptive water use rates appear to be grossly understated in the potential-mining model. According to the model 5.1 mgd would be required to mine ore at the rate of 4 million tons per year. Yet in the 1974 EIS, some 20 mgd was proposed in order to mine ore at the same rate and under the same conditions, a four-fold increase. In nearby Hamilton County, some 16 mgd per 4 million tons of ore mined are required, approximately the same amount per ton as in Southwest Florida.

c. The potential-mining model would appear to understate the scope of mining in the Forest. Only 2 mines are proposed which would remove, at a rate of 4 million tons per year, 100 million tons of ore from some 27,500 acres (17%) of the Forest.[4] As an upper extreme, if

---

[3] Such effects are only now being evaluated in the DER-Industry and DER-EPA studies.

[4] The amount of ore to be mined, under the potential-mining scenario, is very small (5-10%) compared to reserves in Southwest Florida. Either considerably more ore would be mined than proposed or the costs of developing these 2 mines (including the moving of nearby equipment, work forces, etc.) would appear excessive based on a cost-benefit analyses. In the EIS, some 20% more ore was to be mined over an area some 9% larger. If the report was less than candid regarding the possible chemical plant or plants and the amounts of water needed per ton of ore mined, perhaps the amount of reserves available for mining has also been understated.



the entire Forest (156,000 acres) could be mined at the proposed withdrawal rate of 5.1 mgd per 4 million tons of ore, some 29 mgd of fresh make up water would be required. At the rate of 16 mgd per 4 million tons of ore, some 91 mgd would be required, and at 20 mgd per 4 million tons, some 114 mgd would be required.

While it is true that no undue groundwater quantity impacts would result from potential-mining consumptive uses of 5.1 mgd, if larger amounts of ore were mined using water at rates commensurate with mining elsewhere in the state, groundwater impacts would be severe. Withdrawals on the order of 100 mgd would drastically alter groundwater levels in the Floridan aquifer, reduce the flow of the Suwannee River below White Springs, reduce water levels in the watertable and Hawthorn aquifers, preempt large quantities of water from other uses, damage existing users, cause massive mineralized water upwelling into the Floridan aquifer, and greatly increase sinkhole activity. The Osceola National Forest is roughly the same size, in area, as that part of Southwest Florida where existing mining consumes some 250-300 mgd currently.

Conclusions and Recommendation

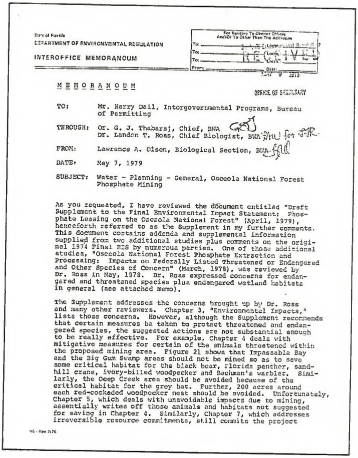
DER's 1974 response to the EIS recommended, on the basis of water quantity and water quality, that the 41 leases not be issued.

Based on the present analysis of the EIS and the USGS report, and on discussions with Ross McWilliams, Landon Rosa, Marvin Collins, Mickey Bryont, Poul Beam, Forrest Fields, Mark Latch, and Jim Miller of the USGS, the following conclusions are offered:

a. Water quantity impacts may or may not have been adequately treated depending upon one's faith in the potential-mining scenario. If only 5.1 mgd were to be withdrawn, then water quantity impacts would be essentially as stated by the USGS. If larger amounts were withdrawn (at least 4 times as much realistically) then the document is inadequate.

b. Water quality impacts would be severe in any case; and these have not been adequately addressed in the report.

Recommend a finding that the document is insufficient to adequately address subject impacts that would be caused by a project of such magnitude -- mining the Osceola National Forest.



State of Florida
DEPARTMENT OF ENVIRONMENTAL REGULATION

INTEROFFICE MEMORANDUM

For Routing To District Offices
And/Or To Other Than The Addressee
To: Loc'n:
To: Loc'n:
To: Loc'n:
From: Date:

RECEIVED
MAY 9 1979
OFFICE OF SECRETARY

MEMORANDUM

TO: Mr. Herry Dail, Intergovernmental Programs, Bureau of Permitting

THROUGH: Dr. G. J. Thabaraj, Chief, BWA GJT
Dr. Landon T. Ross, Chief Biologist, BWA LAO for LTR

FROM: Lawrence A. Olsen, Biological Section, BWA LAO

DATE: May 7, 1979

SUBJECT: Water - Planning - General, Osceola National Forest Phosphate Mining

As you requested, I have reviewed the document entitled "Draft Supplement to the Final Environmental Impact Statement: Phosphate Leasing on the Osceola National Forest" (April, 1979), henceforth referred to as the Supplement in my further comments. This document contains addenda and supplemental information supplied from two additional studies plus comments on the original 1974 Final EIS by numerous parties. One of those additional studies, "Osceola National Forest Phosphate Extraction and Processing: Impacts on Federally Listed Threatened or Endangered and Other Species of Concern" (March, 1978), was reviewed by Dr. Ross in May, 1978. Dr. Ross expressed concerns for endangered and threatened species plus endangered wetland habitats in general (see attached memo).

The Supplement addresses the concerns brought up by Dr. Ross and many other reviewers. Chapter 3, "Environmental Impacts," lists those concerns. However, although the Supplement recommends that certain measures be taken to protect threatened and endangered species, the suggested actions are not substantial enough to be really effective. For example, Chapter 4 deals with mitigative measures for certain of the animals threatened within the proposed mining area. Figure 21 shows that Impassable Bay and the Big Gum Swamp areas should not be mined so as to save some critical habitat for the black bear, Florida panther, sandhill crane, ivory-billed woodpecker and Bachman's warbler. Similarly, the Deep Creek area should be avoided because of the critical habitat for the grey bat. Further, 200 acres around each red-cockaded woodpecker nest should be avoided. Unfortunately, Chapter 5, which deals with unavoidable impacts due to mining, essentially writes off those animals and habitats not suggested for saving in Chapter 4. Similarly, Chapter 7, which addresses irreversible resource commitments, still commits the project

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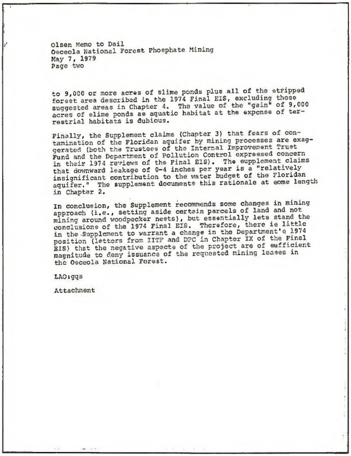


Olsen Memo to Dail
Osceola National Forest Phosphate Mining
May 7, 1979
Page two

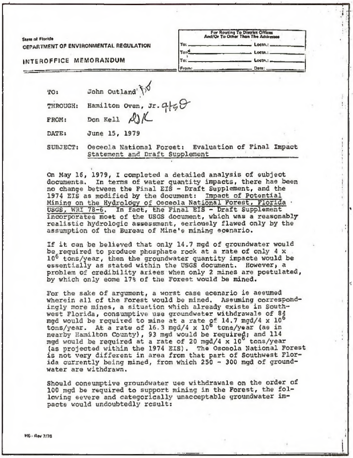
to 9,000 or more acres of slime ponds plus all of the stripped forest area described in the 1974 Final EIS, excluding those suggested areas in Chapter 4. The value of the "gain" of 9,000 acres of slime ponds as aquatic habitat at the expense of terrestrial habitats is dubious.

Finally, the Supplement claims (Chapter 3) that fears of contamination of the Floridan aquifer by mining processes are exaggerated (both the Trustees of the Internal Improvement Trust Fund and the Department of Pollution Control expressed concern in their 1974 reviews of the Final EIS). The supplement claims that downward leakage of 0-4 inches per year is a "relatively insignificant contribution to the water budget of the Floridan aquifer." The supplement documents this rationale at some length in Chapter 2.

In conclusion, the Supplement recommends some changes in mining approach (i.e., setting aside certain parcels of land and not mining around woodpecker nests), but essentially lets stand the conclusions of the 1974 Final EIS. Therefore, there is little in the Supplement to warrant a change in the Department's 1974 position (letters from IITF and DPC in Chapter IX of the Final EIS) that the negative aspects of the project are of sufficient magnitude to deny issuance of the requested mining leases in the Osceola National Forest.

LAO:gqs

Attachment



State of Florida
DEPARTMENT OF ENVIRONMENTAL REGULATION

INTEROFFICE MEMORANDUM

For Routing To District Offices
And/Or To Other Than The Addressee
To: ____________ Locn.: ________
To: ____________ Locn.: ________
To: ____________ Locn.: ________
From: ____________ Date: ________

TO: John Outland

THROUGH: Hamilton Oven, Jr.

FROM: Don Kell

DATE: June 15, 1979

SUBJECT: Osceola National Forest: Evaluation of Final Impact Statement and Draft Supplement

On May 16, 1979, I completed a detailed analysis of subject documents. In terms of water quantity impacts, there has been no change between the Final EIS - Draft Supplement, and the 1974 EIS as modified by the document: Impact of Potential Mining on the Hydrology of Osceola National Forest, Florida USGS, WRI 78-6. In fact, the Final EIS - Draft Supplement incorporates most of the USGS document, which was a reasonably realistic hydrologic assessment, seriously flawed only by the assumption of the Bureau of Mine's mining scenario.

If it can be believed that only 14.7 mgd of groundwater would be required to produce phosphate rock at a rate of only 4 x 10^6 tons/year, then the groundwater quantity impacts would be essentially as stated within the USGS document. However, a problem of credibility arises when only 2 mines are postulated, by which only some 17% of the Forest would be mined.

For the sake of argument, a worst case scenario is assumed wherein all of the Forest would be mined. Assuming correspondingly more mines, a situation which already exists in Southwest Florida, consumptive use groundwater withdrawals of 84 mgd would be required to mine at a rate of 14.7 mgd/4 x 10^6 tons/year. At a rate of 16.3 mgd/4 x 10^6 tons/year (as in nearby Hamilton County), 93 mgd would be required; and 114 mgd would be required at a rate of 20 mgd/4 x 10^6 tons/year (as projected within the 1974 EIS). The Osceola National Forest is not very different in area from that part of Southwest Florida currently being mined, from which 250 - 300 mgd of groundwater are withdrawn.

Should consumptive groundwater use withdrawals on the order of 100 mgd be required to support mining in the Forest, the following severe and categorically unacceptable groundwater impacts would undoubtedly result:

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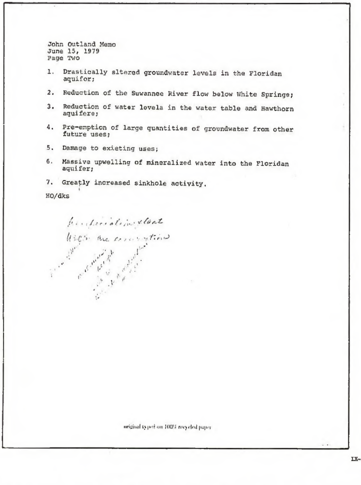

John Outland Memo
June 15, 1979
Page Two

1. Drastically altered groundwater levels in the Floridan aquifer;
2. Reduction of the Suwannee River flow below White Springs;
3. Reduction of water levels in the water table and Hawthorn aquifers;
4. Pre-emption of large quantities of groundwater from other future uses;
5. Damage to existing uses;
6. Massive upwelling of mineralized water into the Floridan aquifer;
7. Greatly increased sinkhole activity.

HO/dks

[illegible]

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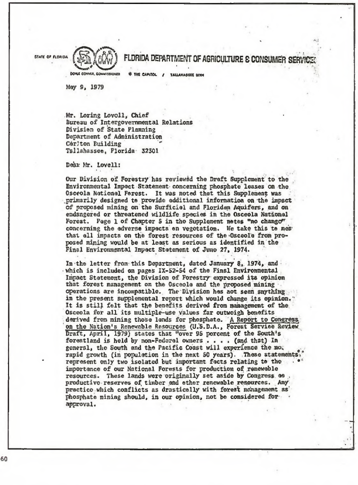


STATE OF FLORIDA
FLORIDA DEPARTMENT OF AGRICULTURE & CONSUMER SERVICE
DOYLE CONNER, COMMISSIONER * THE CAPITOL / TALLAHASSEE 32304

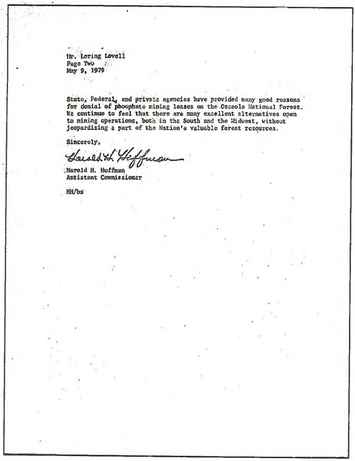
May 9, 1979

Mr. Loring Lovell, Chief
Bureau of Intergovernmental Relations
Division of State Planning
Department of Administration
Carlton Building
Tallahassee, Florida 32301

Dear Mr. Lovell:

Our Division of Forestry has reviewed the Draft Supplement to the Environmental Impact Statement concerning phosphate leases on the Osceola National Forest. It was noted that this Supplement was primarily designed to provide additional information on the impact of proposed mining on the Surficial and Floridan Aquifers, and on endangered or threatened wildlife species in the Osceola National Forest. Page 1 of Chapter 5 in the Supplement notes "no change" concerning the adverse impacts on vegetation. We take this to mean that all impacts on the forest resources of the Osceola from proposed mining would be at least as serious as identified in the Final Environmental Impact Statement of June 27, 1974.

In the letter from this Department, dated January 8, 1974, and which is included on pages IX-52-54 of the Final Environmental Impact Statement, the Division of Forestry expressed its opinion that forest management on the Osceola and the proposed mining operations are incompatible. The Division has not seen anything in the present supplemental report which would change its opinion. It is still felt that the benefits derived from management of the Osceola for all its multiple-use values far outweigh benefits derived from mining those lands for phosphate. A Report to Congress on the Nation's Renewable Resources (U.S.D.A., Forest Service Review Draft, April, 1979) states that "over 95 percent of the South's forestland is held by non-Federal owners . . . . (and that) In general, the South and the Pacific Coast will experience the mo rapid growth (in population in the next 50 years). These statements represent only two isolated but important facts relating to the importance of our National Forests for production of renewable resources. These lands were originally set aside by Congress as productive reserves of timber and other renewable resources. Any practice which conflicts as drastically with forest management as phosphate mining should, in our opinion, not be considered for approval.



Mr. Loring Lovell
Page Two
May 9, 1979

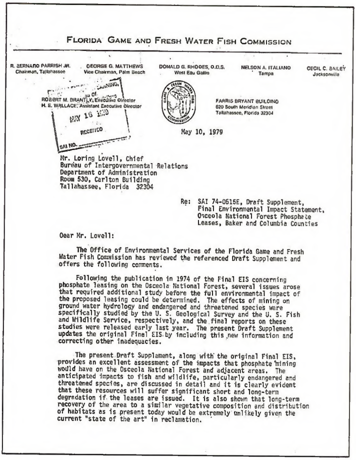
State, Federal, and private agencies have provided many good reasons for denial of phosphate mining leases on the Osceola National Forest. We continue to feel that there are many excellent alternatives open to mining operations, both in the South and the Midwest, without jeopardizing a part of the Nation's valuable forest resources.

Sincerely,

Harold H. Hoffman

Harold H. Hoffman
Assistant Commissioner

HH/bs



FLORIDA GAME AND FRESH WATER FISH COMMISSION

R. BERNARD PARRISH JR.
Chairman, Tallahassee

GEORGE G. MATTHEWS
Vice Chairman, Palm Beach

DONALD G. RHOODES, O.D.S.
West Eau Gallie

NELSON A. ITALIANO
Tampa

CECIL C. BAILEY
Jacksonville

ROBERT M. BRANTLY, Executive Director
H. E. WALLACE, Assistant Executive Director

FARRIS BRYANT BUILDING
620 South Meridian Street
Tallahassee, Florida 32304

PLANNING,
MAY 16 1979
RECEIVED
SAI NO.

May 10, 1979

Mr. Loring Lovell, Chief
Bureau of Intergovernmental Relations
Department of Administration
Room 530, Carlton Building
Tallahassee, Florida 32304

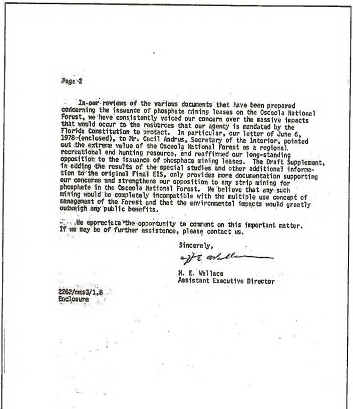
Re: SAI 74-0515E, Draft Supplement,
Final Environmental Impact Statement,
Osceola National Forest Phosphate
Leases, Baker and Columbia Counties

Dear Mr. Lovell:

The Office of Environmental Services of the Florida Game and Fresh Water Fish Commission has reviewed the referenced Draft Supplement and offers the following comments.

Following the publication in 1974 of the Final EIS concerning phosphate leasing on the Osceola National Forest, several issues arose that required additional study before the full environmental impact of the proposed leasing could be determined. The effects of mining on ground water hydrology and endangered and threatened species were specifically studied by the U. S. Geological Survey and the U. S. Fish and Wildlife Service, respectively, and the final reports on these studies were released early last year. The present Draft Supplement updates the original Final EIS by including this new information and correcting other inadequacies.

The present Draft Supplement, along with the original Final EIS, provides an excellent assessment of the impacts that phosphate mining would have on the Osceola National Forest and adjacent areas. The anticipated impacts to fish and wildlife, particularly endangered and threatened species, are discussed in detail and it is clearly evident that these resources will suffer significant short and long-term degradation if the leases are issued. It is also shown that long-term recovery of the area to a similar vegetative composition and distribution of habitats as is present today would be extremely unlikely given the current "state of the art" in reclamation.



Page 2

In our reviews of the various documents that have been prepared concerning the issuance of phosphate mining leases on the Osceola National Forest, we have consistently voiced our concern over the massive impacts that would occur to the resources that our agency is mandated by the Florida Constitution to protect. In particular, our letter of June 6, 1978 (enclosed), to Mr. Cecil Andrus, Secretary of the Interior, pointed out the extreme value of the Osceola National Forest as a regional recreational and hunting resource, and reaffirmed our long-standing opposition to the issuance of phosphate mining leases. The Draft Supplement, in adding the results of the special studies and other additional information to the original Final EIS, only provides more documentation supporting our concerns and strengthens our opposition to any strip mining for phosphate in the Osceola National Forest. We believe that any such mining would be completely incompatible with the multiple use concept of management of the Forest and that the environmental impacts would greatly outweigh any public benefits.

We appreciate the opportunity to comment on this important matter. If we may be of further assistance, please contact us.

Sincerely,

H. E. Wallace
Assistant Executive Director

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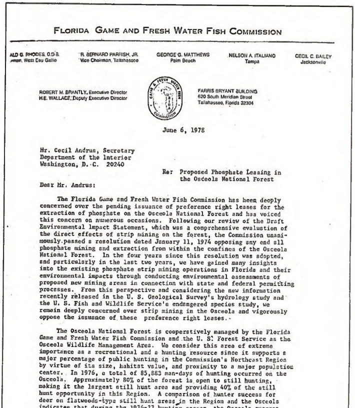
Enclosure



FLORIDA GAME AND FRESH WATER FISH COMMISSION

ALD G. RHODES, O.D.S.
man, West Eau Gallie

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Tampa

CECIL C. BAILEY
Jacksonville

ROBERT M. BRANTLY, Executive Director
H.E. WALLACE, Deputy Executive Director

FARRIS BRYANT BUILDING
620 South Meridian Street
Tallahassee, Florida 32304

June 6, 1978

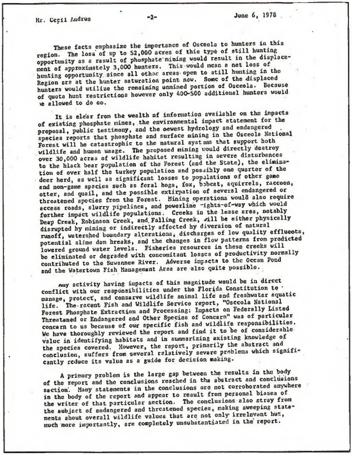
Mr. Cecil Andrus, Secretary
Department of the Interior
Washington, D. C. 20240

Re: Proposed Phosphate Leasing in
the Osceola National Forest

Dear Mr. Andrus:

The Florida Game and Fresh Water Fish Commission has been deeply concerned over the pending issuance of preference right leases for the extraction of phosphate on the Osceola National Forest and has voiced this concern on numerous occasions. Following our review of the Draft Environmental Impact Statement, which was a comprehensive evaluation of the direct effects of strip mining on the forest, the Commission unanimously passed a resolution dated January 11, 1974 opposing any and all phosphate mining and extraction from within the confines of the Osceola National Forest. In the four years since this resolution was adopted, and particularly in the last two years, we have gained many insights into the existing phosphate strip mining operations in Florida and their environmental impacts through conducting environmental assessments of proposed new mining areas in connection with state and federal permitting processes. From this perspective and considering the new information recently released in the U. S. Geological Survey's hydrology study and the U. S. Fish and Wildlife Service's endangered species study, we remain deeply concerned over strip mining in the Osceola and vigorously oppose the issuance of these preference right leases.

The Osceola National Forest is cooperatively managed by the Florida Game and Fresh Water Fish Commission and the U. S. Forest Service as the Osceola Wildlife Management Area. We consider this area of extreme importance as a recreational and a hunting resource since it supports a major percentage of public hunting in the Commission's Northeast Region by virtue of its size, habitat value, and proximity to a major population center. In 1976, a total of 85,883 man-days of hunting occurred on the Osceola. Approximately 80% of the forest is open to still hunting, making it the largest still hunt area and providing 40% of the still hunt opportunity in this Region. A comparison of hunter success for deer on flatwoods-type still hunt areas in the Region and the Osceola indicates that during the 1976-77 hunting season, the Osceola success rate was the highest of all management areas.



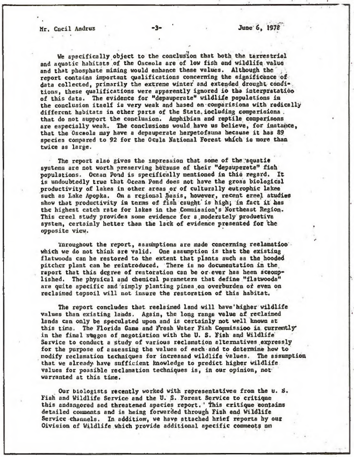
Mr. Cecil Andrus -2- June 6, 1978

These facts emphasize the importance of Osceola to hunters in this region. The loss of up to 52,000 acres of this type of still hunting opportunity as a result of phosphate mining would result in the displacement of approximately 3,000 hunters. This would mean a net loss of hunting opportunity since all other areas open to still hunting in the Region are at the hunter saturation point now. Some of the displaced hunters would utilize the remaining unmined portion of Osceola. Because of quota hunt restrictions however only 400-500 additional hunters would be allowed to do so.

It is clear from the wealth of information available on the impacts of existing phosphate mines, the environmental impact statement for the proposal, public testimony, and the newest hydrology and endangered species reports that phosphate and surface mining in the Osceola National Forest will be catastrophic to the natural systems that support both wildlife and human usage. The proposed mining would directly destroy over 30,000 acres of wildlife habitat resulting in severe disturbances to the black bear population of the Forest (and the State), the elimination of over half the turkey population and possibly one quarter of the deer herd, as well as significant losses to populations of other game and non-game species such as feral hogs, fox, bobcat, squirrels, raccoon, otter, and quail, and the possible extirpation of several endangered or threatened species from the Forest. Mining operations would also require access roads, slurry pipelines, and powerline rights-of-way which would further impact wildlife populations. Creeks in the lease area, notably Deep Creek, Robinson Creek, and Falling Creek, will be either physically disrupted by mining or indirectly affected by diversion of natural runoff, watershed boundary alterations, discharges of low quality effluents, potential slime dam breaks, and the changes in flow patterns from predicted lowered ground water levels. Fisheries resources in these creeks will be eliminated or degraded with concomitant losses of productivity normally contributed to the Suwannee River. Adverse impacts to the Ocean Pond and the Watertown Fish Management Area are also quite possible.

Any activity having impacts of this magnitude would be in direct conflict with our responsibilities under the Florida Constitution to manage, protect, and conserve wildlife animal life and freshwater aquatic life. The recent Fish and Wildlife Service report, "Osceola National Forest Phosphate Extraction and Processing: Impacts on Federally Listed Threatened or Endangered and Other Species of Concern" was of particular concern to us because of our specific fish and wildlife responsibilities. We have thoroughly reviewed the report and find it to be of considerable value in identifying habitats and in summarizing existing knowledge of the species covered. However, the report, primarily the abstract and conclusion, suffers from several relatively severe problems which significantly reduce its value as a guide for decision making.

A primary problem is the large gap between the results in the body of the report and the conclusions reached in the abstract and conclusions section. Many statements in the conclusions are not corroborated anywhere in the body of the report and appear to result from personal biases of the writer of that particular section. The conclusions also stray from the subject of endangered and threatened species, making sweeping statements about overall wildlife values that are not only irrelevant but, much more importantly, are completely unsubstantiated in the report.



Mr. Cecil Andrus -3- June 6, 1978

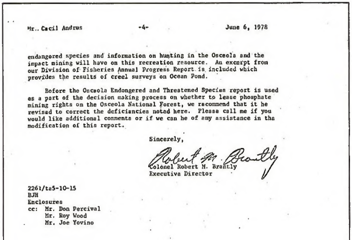
We specifically object to the conclusion that both the terrestrial and aquatic habitats of the Osceola are of low fish and wildlife value and that phosphate mining would enhance these values. Although the report contains important qualifications concerning the significance of data collected, primarily the extreme winter and extended drought conditions, these qualifications were apparently ignored in the interpretation of this data. The evidence for "depauperate" wildlife populations in the conclusion itself is very weak and based on comparisions with radically different habitats in other parts of the State including comparisions that do not support the conclusion. Amphibian and reptile comparisons are especially weak. The conclusions would have us believe, for instance, that the Osceola may have a depauperate herpetofauna because it has 89 species compared to 92 for the Ocala National Forest which is more than twice as large.

The report also gives the impression that some of the aquatic systems are not worth preserving because of their "depauperate" fish populations. Ocean Pond is specifically mentioned in this regard. It is undoubtedly true that Ocean Pond does not have the gross biological productivity of lakes in other areas or of culturally eutrophic lakes such as Lake Apopka. On a regional basis, however, recent creel studies show that productivity in terms of fish caught is high; in fact it has the highest catch rate for lakes in the Commission's Northeast Region. This creel study provides some evidence for a moderately productive system, certainly better than the lack of evidence presented for the opposite view.

Throughout the report, assumptions are made concerning reclamation which we do not think are valid. One assumption is that the existing flatwoods can be restored to the extent that plants such as the hooded pitcher plant can be reintroduced. There is no documentation in the report that this degree of restoration can be or ever has been accomplished. The physical and chemical parameters that define "flatwoods" are quite specific and simply planting pines on overburden or even on reclaimed topsoil will not insure the restoration of this habitat.

The report concludes that reclaimed land will have higher wildlife values than existing lands. Again, the long range value of reclaimed lands can only be speculated upon and is certainly not well known at this time. The Florida Game and Fresh Water Fish Commission is currently in the final stages of negotiation with the U. S. Fish and Wildlife Service to conduct a study of various reclamation alternatives expressly for the purpose of assessing the values of each and to determine how to modify reclamation techniques for increased wildlife values. The assumption that we already have sufficient knowledge to predict higher wildlife values for possible reclamation techniques is, in our opinion, not warranted at this time.

Our biologists recently worked with representatives from the U. S. Fish and Wildlife Service and the U. S. Forest Service to critique this endangered and threatened species report. This critique contains detailed comments and is being forwarded through Fish and Wildlife Service channels. In addition, we have attached brief reports by our Division of Wildlife which provide additional specific comments on



Mr. Cecil Andrus -4- June 6, 1978

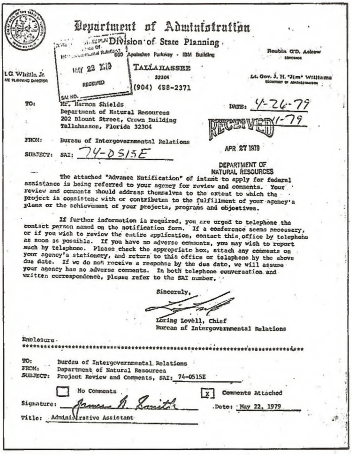
endangered species and information on hunting in the Osceola and the impact mining will have on this recreation resource. An excerpt from our Division of Fisheries Annual Progress Report is included which provides the results of creel surveys on Ocean Pond.

Before the Osceola Endangered and Threatened Species report is used as a part of the decision making process on whether to lease phosphate mining rights on the Osceola National Forest, we recommend that it be revised to correct the deficiencies noted here. Please call me if you would like additional comments or if we can be of any assistance in the modification of this report.

Sincerely,

Robert M. Brantly
Colonel Robert M. Brantly
Executive Director

2261/ta5-10-15
BJH
Enclosures
cc: Mr. Don Percival
Mr. Roy Wood
Mr. Joe Yovino



Department of Administration

Division of State Planning
660 Apalachee Parkway - IBM Building
TALLAHASSEE
32304
(904) 488-2371

I.G. Whittle, Jr.
State Planning Director

Reubin O'D. Askew
Governor

Lt. Gov. J. H. "Jim" Williams
Secretary of Administration

Bureau of Intergovernmental Relations
MAY 22 1979
RECEIVED
SAI NO.

TO: Mr. Harmon Shields
Department of Natural Resources
202 Blount Street, Crown Building
Tallahassee, Florida 32304

DATE: 4-26-79

DUE DATE: 1-79

RECEIVED
APR 27 1979
DEPARTMENT OF NATURAL RESOURCES

FROM: Bureau of Intergovernmental Relations

SUBJECT: SAI: 74-0515E

The attached "Advance Notification" of intent to apply for federal assistance is being referred to your agency for review and comments. Your review and comments should address themselves to the extent to which the project is consistent with or contributes to the fulfillment of your agency's plans or the achievement of your projects, programs and objectives.

If further information is required, you are urged to telephone the contact person named on the notification form. If a conference seems necessary, or if you wish to review the entire application, contact this office by telephone as soon as possible. If you have no adverse comments, you may wish to report such by telephone. Please check the appropriate box, attach any comments on your agency's stationery, and return to this office or telephone by the above due date. If we do not receive a response by the due date, we will assume your agency has no adverse comments. In both telephone conversation and written correspondence, please refer to the SAI number.

Sincerely,

Loring Lovell, Chief
Bureau of Intergovernmental Relations

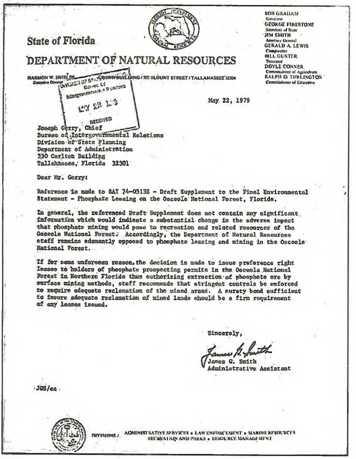
Enclosure

****

TO: Burdau of Intergovernmental Relations
FROM: Department of Natural Resources
SUBJECT: Project Review and Comments, SAI: 74-0515E

☐ No Comments ☒ Comments Attached

Signature: James B. Smith Date: May 22, 1979
Title: Administrative Assistant



State of Florida

DEPARTMENT OF NATURAL RESOURCES

BOB GRAHAM
Governor
GEORGE FIRESTONE
Secretary of State
JIM SMITH
Attorney General
GERALD A. LEWIS
Comptroller
BILL GUNTER
Treasurer
DOYLE CONNER
Commissioner of Agriculture
RALPH D. TURLINGTON
Commissioner of Education

HARMON W. SHIELDS
Executive Director

CROWN BUILDING / 202 BLOUNT STREET / TALLAHASSEE 32304

DIVISION OF STATE PLANNING
Bureau of
Intergovernmental Relations
MAY 29 1979
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May 22, 1979

Joseph Gerry, Chief
Bureau of Intergovernmental Relations
Division of State Planning
Department of Administration
530 Carlton Building
Tallahassee, Florida 32301

Dear Mr. Gerry:

Reference is made to SAI 74-0515E - Draft Supplement to the Final Environmental Statement - Phosphate Leasing on the Osceola National Forest, Florida.

In general, the referenced Draft Supplement does not contain any significant information which would indicate a substantial change in the adverse impact that phosphate mining would pose to recreation and related resources of the Osceola National Forest. Accordingly, the Department of Natural Resources staff remains adamantly opposed to phosphate leasing and mining in the Osceola National Forest.

If for some unforeseen reason, the decision is made to issue preference right leases to holders of phosphate prospecting permits in the Osceola National Forest in Northern Florida thus authorizing extraction of phosphate ore by surface mining methods, staff recommends that stringent controls be enforced to require adequate reclamation of the mined areas. A surety bond sufficient to insure adequate reclamation of mined lands should be a firm requirement of any leases issued.

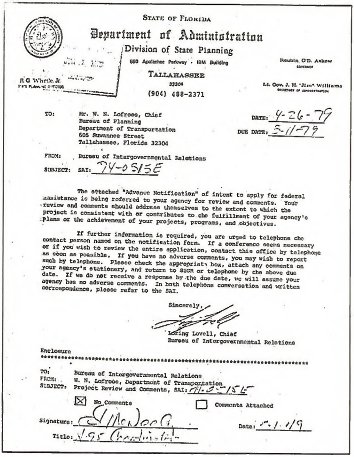
Sincerely,

James G. Smith

James G. Smith
Administrative Assistant

JGS/ce

DIVISIONS / ADMINISTRATIVE SERVICES • LAW ENFORCEMENT • MARINE RESOURCES
RECREATION AND PARKS • RESOURCE MANAGEMENT



STATE OF FLORIDA

Department of Administration

Division of State Planning

580 Apalachee Parkway · IBM Building

TALLAHASSEE

32304

(904) 488-2371

R G Whittle, Jr.
STATE PLANNING DIRECTOR

Reubin O'D. Askew
GOVERNOR

Lt. Gov. J. H. "Jim" Williams
SECRETARY OF ADMINISTRATION

TO: Mr. W. N. Lofroos, Chief
Bureau of Planning
Department of Transportation
605 Suwannee Street
Tallahassee, Florida 32304

DATE: 4-26-79

DUE DATE: 5-11-79

FROM: Bureau of Intergovernmental Relations

SUBJECT: SAI: 74-0515E

The attached "Advance Notification" of intent to apply for federal assistance is being referred to your agency for review and comments. Your review and comments should address themselves to the extent to which the project is consistent with or contributes to the fulfillment of your agency's plans or the achievement of your projects, programs, and objectives.

If further information is required, you are urged to telephone the contact person named on the notification form. If a conference seems necessary or if you wish to review the entire application, contact this office by telephone as soon as possible. If you have no adverse comments, you may wish to report such by telephone. Please check the appropriate box, attach any comments on your agency's stationery, and return to SIGR or telephone by the above due date. If we do not receive a response by the due date, we will assume your agency has no adverse comments. In both telephone conversation and written correspondence, please refer to the SAI.

Sincerely,

Loring Lovell, Chief
Bureau of Intergovernmental Relations

Enclosure

****

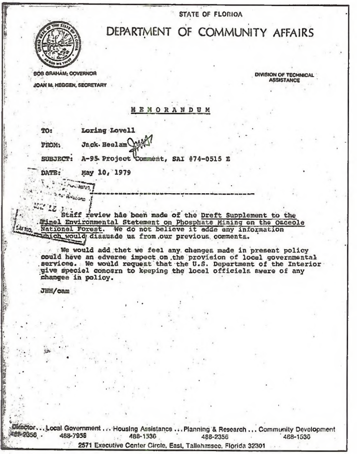
TO: Bureau of Intergovernmental Relations
FROM: W. N. Lofroos, Department of Transportation
SUBJECT: Project Review and Comments, SAI: 74-0515E

☒ No Comments ☐ Comments Attached

Signature:

Date: 5-1-79

Title: A-95 Coordinator



STATE OF FLORIDA

DEPARTMENT OF COMMUNITY AFFAIRS

BOB GRAHAM, GOVERNOR

JOAN M. HEGGEN, SECRETARY

DIVISION OF TECHNICAL ASSISTANCE

MEMORANDUM

TO: Loring Lovell

FROM: Jack Heelam

SUBJECT: A-95 Project Comment, SAI #74-0515 E

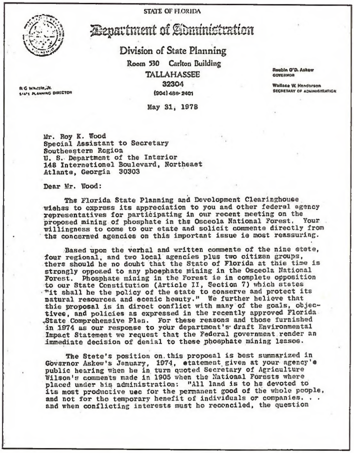
DATE: May 10, 1979

Staff review has been made of the Draft Supplement to the Final Environmental Statement on Phosphate Mining on the Osceola National Forest. We do not believe it adds any information which would dissuade us from our previous comments.

We would add that we feel any changes made in present policy could have an adverse impact on the provision of local governmental services. We would request that the U.S. Department of the Interior give special concern to keeping the local officials aware of any changes in policy.

JHH/cam

Director ... Local Government ... Housing Assistance ... Planning & Research ... Community Development
488-2356 488-7956 488-1536 488-2356 488-1536
2571 Executive Center Circle, East, Tallahassee, Florida 32301



STATE OF FLORIDA

Department of Administration

Division of State Planning

Room 530 Carlton Building

TALLAHASSEE

32304

(904) 488-2401

R G Whittle, Jr.
STATE PLANNING DIRECTOR

Reubin O'D. Askew
GOVERNOR

Wallace W. Henderson
SECRETARY OF ADMINISTRATION

May 31, 1978

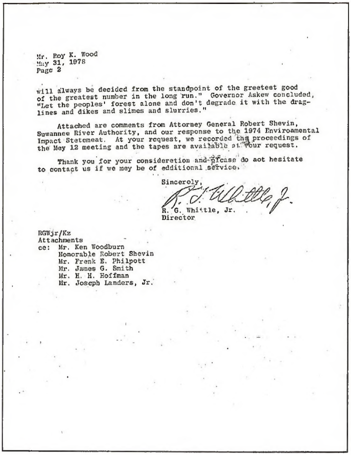
Mr. Roy K. Wood
Special Assistant to Secretary
Southeastern Region
U. S. Department of the Interior
148 International Boulevard, Northeast
Atlanta, Georgia 30303

Dear Mr. Wood:

The Florida State Planning and Development Clearinghouse wishes to express its appreciation to you and other federal agency representatives for participating in our recent meeting on the proposed mining of phosphate in the Osceola National Forest. Your willingness to come to our state and solicit comments directly from the concerned agencies on this important issue is most reassuring.

Based upon the verbal and written comments of the nine state, four regional, and two local agencies plus two citizen groups, there should be no doubt that the State of Florida at this time is strongly opposed to any phosphate mining in the Osceola National Forest. Phosphate mining in the Forest is in complete opposition to our State Constitution (Article II, Section 7) which states "it shall be the policy of the state to conserve and protect its natural resources and scenic beauty." We further believe that this proposal is in direct conflict with many of the goals, objectives, and policies as expressed in the recently approved Florida State Comprehensive Plan. For these reasons and those furnished in 1974 as our response to your department's draft Environmental Impact Statement we request that the Federal government render an immediate decision of denial to these phosphate mining leases.

The State's position on this proposal is best summarized in Governor Askew's January, 1974, statement given at your agency's public hearing when he in turn quoted Secretary of Agriculture Wilson's comments made in 1905 when the National Forests where placed under his administration: "All land is to be devoted to its most productive use for the permanent good of the whole people, and not for the temporary benefit of individuals or companies. . . and when conflicting interests must be reconciled, the question



Mr. Roy K. Wood
May 31, 1978
Page 2

will always be decided from the standpoint of the greatest good of the greatest number in the long run." Governor Askew concluded, "Let the peoples' forest alone and don't degrade it with the draglines and dikes and slimes and slurries."

Attached are comments from Attorney General Robert Shevin, Suwannee River Authority, and our response to the 1974 Environmental Impact Statement. At your request, we recorded the proceedings of the May 12 meeting and the tapes are available at your request.

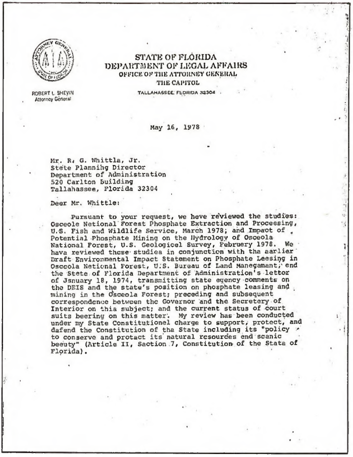
Thank you for your consideration and please do not hesitate to contact us if we may be of additional service.

Sincerely,

R. G. Whittle, Jr.

R. G. Whittle, Jr.
Director

RGWjr/Kz
Attachments
cc: Mr. Ken Woodburn
Honorable Robert Shevin
Mr. Frank E. Philpott
Mr. James G. Smith
Mr. H. H. Hoffman
Mr. Joseph Landers, Jr.



STATE OF FLORIDA
DEPARTMENT OF LEGAL AFFAIRS
OFFICE OF THE ATTORNEY GENERAL
THE CAPITOL
TALLAHASSEE, FLORIDA 32304

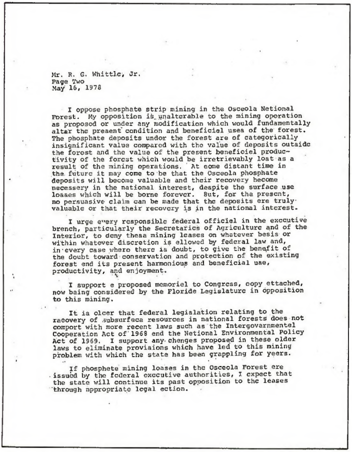
ROBERT L. SHEVIN
Attorney General

May 16, 1978

Mr. R. G. Whittle, Jr.
State Planning Director
Department of Administration
520 Carlton Building
Tallahassee, Florida 32304

Dear Mr. Whittle:

Pursuant to your request, we have reviewed the studies: Osceola National Forest Phosphate Extraction and Processing, U.S. Fish and Wildlife Service, March 1978; and Impact of Potential Phosphate Mining on the Hydrology of Osceola National Forest, U.S. Geological Survey, February 1978. We have reviewed these studies in conjunction with the earlier Draft Environmental Impact Statement on Phosphate Leasing in Osceola National Forest, U.S. Bureau of Land Management, and the State of Florida Department of Administration's letter of January 18, 1974, transmitting state agency comments on the DEIS and the state's position on phosphate leasing and mining in the Osceola Forest; preceding and subsequent correspondence between the Governor and the Secretary of Interior on this subject; and the current status of court suits bearing on this matter. My review has been conducted under my State Constitutional charge to support, protect, and defend the Constitution of the State including its "policy to conserve and protect its natural resources and scenic beauty" (Article II, Section 7, Constitution of the State of Florida).



Mr. R. G. Whittle, Jr.
Page Two
May 16, 1978

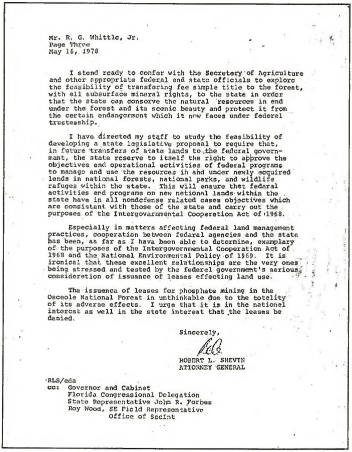
I oppose phosphate strip mining in the Osceola National Forest. My opposition is unalterable to the mining operation as proposed or under any modification which would fundamentally alter the present condition and beneficial uses of the forest. The phosphate deposits under the forest are of categorically insignificant value compared with the value of deposits outside the forest and the value of the present beneficial productivity of the forest which would be irretrievably lost as a result of the mining operations. At some distant time in the future it may come to be that the Osceola phosphate deposits will become valuable and their recovery become necessary in the national interest, despite the surface use losses which will be borne forever. But, for the present, no persuasive claim can be made that the deposits are truly valuable or that their recovery is in the national interest.

I urge every responsible federal official in the executive branch, particularly the Secretaries of Agriculture and of the Interior, to deny these mining leases on whatever basis or within whatever discretion is allowed by federal law and, in every case where there is doubt, to give the benefit of the doubt toward conservation and protection of the existing forest and its present harmonious and beneficial use, productivity, and enjoyment.

I support a proposed memorial to Congress, copy attached, now being considered by the Florida Legislature in opposition to this mining.

It is clear that federal legislation relating to the recovery of subsurface resources in national forests does not comport with more recent laws such as the Intergovernmental Cooperation Act of 1968 and the National Environmental Policy Act of 1969. I support any changes proposed in these older laws to eliminate provisions which have led to this mining problem with which the state has been grappling for years.

If phosphate mining leases in the Osceola Forest are issued by the federal executive authorities, I expect that the state will continue its past opposition to the leases through appropriate legal action.



Mr. R. G. Whittle, Jr.
Page Three
May 16, 1978

I stand ready to confer with the Secretary of Agriculture and other appropriate federal and state officials to explore the feasibility of transfering fee simple title to the forest, with all subsurface mineral rights, to the state in order that the state can conserve the natural resources in and under the forest and its scenic beauty and protect it from the certain endangerment which it now faces under federal trusteeship.

I have directed my staff to study the feasibility of developing a state legislative proposal to require that, in future transfers of state lands to the federal government, the state reserve to itself the right to approve the objectives and operational activities of federal programs to manage and use the resources in and under newly acquired lands in national forests, national parks, and wildlife refuges within the state. This will ensure that federal activities and programs on new national lands within the state have in all nondefense related cases objectives which are consistent with those of the state and carry out the purposes of the Intergovernmental Cooperation Act of 1968.

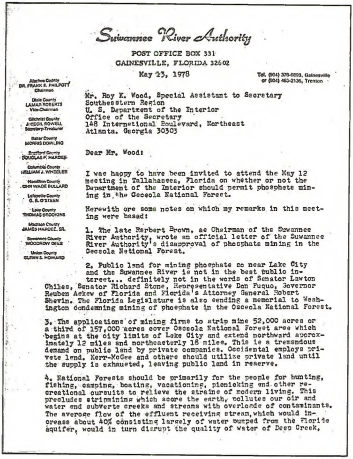
Especially in matters affecting federal land management practices, cooperation between federal agencies and the state has been, as far as I have been able to determine, exemplary of the purposes of the Intergovernmental Cooperation Act of 1968 and the National Environmental Policy of 1969. It is ironical that these excellent relationships are the very ones being stressed and tested by the federal government's serious consideration of issuance of leases effecting land use.

The issuance of leases for phosphate mining in the Osceola National Forest in unthinkable due to the totality of its adverse effects. I urge that it is in the national interest as well in the state interest that the leases be denied.

Sincerely,

ROBERT L. SHEVIN
ATTORNEY GENERAL

RLS/eda
cc: Governor and Cabinet
Florida Congressional Delegation
State Representative John R. Forbes
Roy Wood, SE Field Representative
Office of SecInt



Suwannee River Authority

POST OFFICE BOX 331
GAINESVILLE, FLORIDA 32602

Tel. (904) 376-6893, Gainesville
or (904) 463-2136, Trenton

Alachua County
DR. FRANK E. PHILPOTT
Chairman

Dixie County
LAMAR ROBERTS
Vice-Chairman

Gilchrist County
J. CECIL ROWELL
Secretary-Treasurer

Baker County
MORRIS DOWLING

Bradford County
DOUGLAS P. HARDEE

Columbia County
WILLIAM J. WHEELER

Hamilton County
JOHN WADE BULLARD

Lafayette County
G. B. O'STEEN

Levy County
THOMAS BROOKINS

Madison County
JAMES HARDEE, SR.

Suwannee County
WOODROW OEES

Union County
GLENN S. HOWARD

May 13, 1978

Mr. Roy K. Wood, Special Assistant to Secretary
Southeastern Region
U. S. Department of the Interior
Office of the Secretary
148 International Boulevard, Northeast
Atlanta, Georgia 30303

Dear Mr. Wood:

I was happy to have been invited to attend the May 12 meeting in Tallahassee, Florida on whether or not the Department of the Interior should permit phosphate mining in the Osceola National Forest.

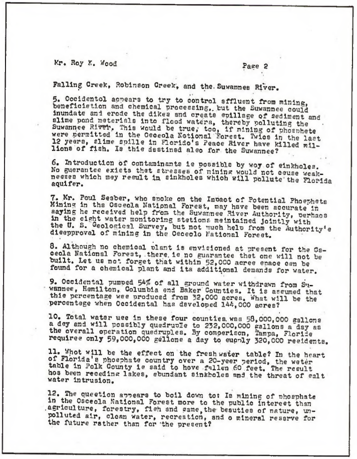
Herewith are some notes on which my remarks in this meeting were based:

1. The late Herbert Brown, as Chairman of the Suwannee River Authority, wrote an official letter of the Suwannee River Authority's disapproval of phosphate mining in the Osceola National Forest.

2. Public land for mining phosphate so near Lake City and the Suwannee River is not in the best public interest... definitely not in the words of Senator Lawton Chiles, Senator Richard Stone, Representative Don Fuquo, Governor Reuben Askew of Florida and Florida's Attorney General Robert Shevin. The Florida Legislature is also sending a memorial to Washington condemning mining of phosphate in the Osceola National Forest.

3. The applications of mining firms to strip mine 52,000 acres or a third of 157,000 acres cover Osceola National Forest area which begins at the city limits of Lake City and extend northward approximately 12 miles and northeasterly 18 miles. This is a tremendous demand on public land by private companies. Occidental employs private land. Kerr-McGee and others should utilize private land until the supply is exhausted, leaving public land in reserve.

4. National Forests should be primarily for the people for hunting, fishing, camping, boating, vacationing, picnicking and other recreational pursuits to relieve the strains of modern living. This precludes stripmining which score the earth, pollutes our air and water and subverts creeks and streams with overloads of contaminants. The average flow of the effluent receiving stream, which would increase about 40% consisting largely of water pumped from the Florida aquifer, would in turn disrupt the quality of water of Deep Creek,



Mr. Roy K. Wood Page 2

Falling Creek, Robinson Creek, and the Suwannee River.

5. Occidental appears to try to control effluent from mining, beneficiation and chemical processing, but the Suwannee could inundate and erode the dikes and create spillage of sediment and slime pond materials into flood waters, thereby polluting the Suwannee River. This would be true, too, if mining of phosphate were permitted in the Osceola National Forest. Twice in the last 12 years, slime spills in Florida's Peace River have killed millions of fish. Is this destined also for the Suwannee?

6. Introduction of contaminants is possible by way of sinkholes. No guarantee exists that stresses of mining would not cause weaknesses which may result in sinkholes which will pollute the Florida aquifer.

7. Mr. Paul Seaber, who spoke on the Impact of Potential Phosphate Mining in the Osceola National Forest, may have been accurate in saying he received help from the Suwannee River Authority, perhaps in the eight water monitoring stations maintained jointly with the U. S. Geological Survey, but not much help from the Authority's disapproval of mining in the Osceola National Forest.

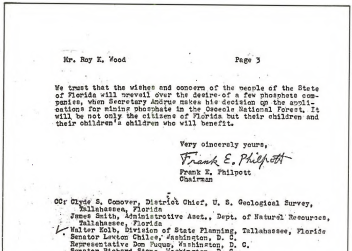
8. Although no chemical plant is envisioned at present for the Osceola National Forest, there is no guarantee that one will not be built. Let us not forget that within 52,000 acres space can be found for a chemical plant and its additional demands for water.

9. Occidental pumped 54% of all ground water withdrawn from Suwannee, Hamilton, Columbia and Baker Counties. It is assumed that this percentage was produced from 32,000 acres. What will be the percentage when Occidental has developed 144,000 acres?

10. Total water use in these four counties was 58,000,000 gallons a day and will possibly quadruple to 232,000,000 gallons a day as the overall operation quadruples. By comparison, Tampa, Florida requires only 59,000,000 gallons a day to supply 320,000 residents.

11. What will be the effect on the fresh water table? In the heart of Florida's phosphate country over a 20-year period, the water table in Polk County is said to have fallen 60 feet. The result has been receding lakes, abundant sinkholes and the threat of salt water intrusion.

12. The question appears to boil down to: Is mining of phosphate in the Osceola National Forest more to the public interest than agriculture, forestry, fish and game, the beauties of nature, unpolluted air, clean water, recreation, and a mineral reserve for the future rather than for the present?



Mr. Roy K. Wood Page 3

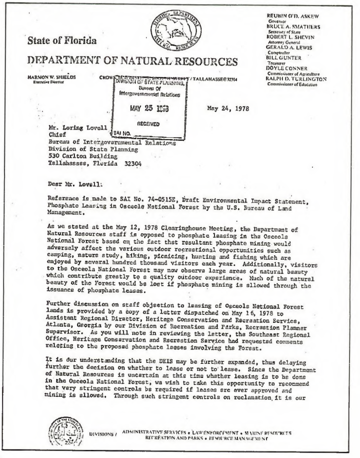
We trust that the wishes and concern of the people of the State of Florida will prevail over the desire of a few phosphate companies, when Secretary Andrus makes his decision on the applications for mining phosphate in the Osceola National Forest. It will be not only the citizens of Florida but their children and their children's children who will benefit.

Very sincerely yours,

Frank E. Philpott

Frank E. Philpott
Chairman

CC: Clyde S. Conover, District Chief, U. S. Geological Survey, Tallahassee, Florida
James Smith, Administrative Asst., Dept. of Natural Resources, Tallahassee, Florida
✓ Walter Kolb, Division of State Planning, Tallahassee, Florida
Senator Lawton Chiles, Washington, D. C.
Representative Don Fuqua, Washington, D. C.
Senator Richard Stone, Washington, D. C.
Governor Reuben Askew, The Capitol, Tallahassee, Florida
Robert L. Shevin, Attorney-General, The Capitol, Tallahassee, Florida
Joseph W. Landers, Jr., Sec'y., Dept. of Environmental Regulation, Tallahassee, Florida



State of Florida
DEPARTMENT OF NATURAL RESOURCES

HARMON W. SHIELDS
Executive Director

CROWN BUILDING / 202 BLOUNT STREET / TALLAHASSEE 32304

REUBIN O'D. ASKEW
Governor
BRUCE A. SMATHERS
Secretary of State
ROBERT L. SHEVIN
Attorney General
GERALD A. LEWIS
Comptroller
BILL GUNTER
Treasurer
DOYLE CONNER
Commissioner of Agriculture
RALPH D. TURLINGTON
Commissioner of Education

DIVISION OF STATE PLANNING,
Bureau Of
Intergovernmental Relations
MAY 25 1978
RECEIVED
SAI NO.

May 24, 1978

Mr. Loring Lovell
Chief
Bureau of Intergovernmental Relations
Division of State Planning
530 Carlton Building
Tallahassee, Florida 32304

Dear Mr. Lovell:

Reference is made to SAI No. 74-0515E, Draft Environmental Impact Statement, Phosphate Leasing in Osceola National Forest by the U.S. Bureau of Land Management.

As we stated at the May 12, 1978 Clearinghouse Meeting, the Department of Natural Resources staff is opposed to phosphate leasing in the Osceola National Forest based on the fact that resultant phosphate mining would adversely affect the various outdoor recreational opportunities such as camping, nature study, hiking, picnicing, hunting and fishing which are enjoyed by several hundred thousand visitors each year. Additionally, visitors to the Osceola National Forest may now observe large areas of natural beauty which contribute greatly to a quality outdoor experience. Much of the natural beauty of the Forest would be lost if phosphate mining is allowed through the issuance of phosphate leases.

Further discussion on staff objection to leasing of Osceola National Forest lands is provided by a copy of a letter dispatched on May 16, 1978 to Assistant Regional Director, Heritage Conservation and Recreation Service, Atlanta, Georgia by our Division of Recreation and Parks, Recreation Planner Supervisor. As you will note in reviewing the letter, the Southeast Regional Office, Heritage Conservation and Recreation Service had requested comments relating to the proposed phosphate leases involving the Forest.

It is our understanding that the DEIS may be further expanded, thus delaying further the decision on whether to lease or not to lease. Since the Department of Natural Resources is uncertain at this time whether leasing is to be done in the Osceola National Forest, we wish to take this opportunity to recommend that very stringent controls be required if leases are ever approved and mining is allowed. Through such stringent controls on reclamation, it is our

DIVISIONS / ADMINISTRATIVE SERVICES • LAW ENFORCEMENT • MARINE RESOURCES
RECREATION AND PARKS • RESOURCE MANAGEMENT

Mr. Loring Lovell
May 24, 1978
Page 2

belief that perhaps a small portion of the recreational losses may in time be recovered.

Sincerely,

James G. Smith
James G. Smith
Administrative Assistant

JGS/ct
Enclosure

May 16, 1978

Mr. John T. Brown
Assistant Regional Director
Heritage Conservation and Recreation Service
Southeast Regional Office
148 International Boulevard
Atlanta, Georgia 30303

Dear Mr. Brown:

Mr. Landrum asked me to respond to your letter of May 2, in which you requested comments relating to the proposed phosphate mining in Osceola National Forest, Florida. This letter will provide information for the Heritage Conservation and Recreation Service report for the meeting in Atlanta on May 16, 1978.

Osceola National Forest provides various types of public uses. The forest represents a sizable land area in north Florida which produces wildlife and timber, and offers numerous outdoor recreational opportunities such as hunting, fishing, camping, hiking and nature study. Visitors to the National Forest may observe areas of natural beauty, which contribute to a quality outdoor experience.

Several special feature areas within the forest that help characterize this region have received particular attention. Big Gum Swamp has been proposed for study for possible inclusion in the National Wilderness System. Approximately one half of this swamp is within the lands proposed for leasing and would be completely lost if mining were to occur. The Sante Fe and Suwannee Rivers, with drainage basins in the forest, have been considered for inclusion in the National Wild and Scenic Rivers System. Mining activitie in the forest could seriously affect the natural values of these riverine systems. A twenty-one mile section of the Florida Trail meanders through the Osceola National Forest. A portion of the trail and its recreational use would be eliminated if the proposed mining activity is permitted.

The Florida Defenders of the Environment have stated that the greatest value of Osceola Forest is for recreation activities and aesthetics. Indeed, recreation participation is a substantial part of the forests' function. For example, the Florida Game and Fresh Water Fish Commission estimates that 7,250 people hunted in the forest during the 1975-76 season. A mail survey by the Commission indicates the forest was the location of 80,000 man/days of hunting. It is expected that recreational hunting in the forest would be depleted by one-third if the forest is mined. Fishing is another recreational experience provided by the forest, however no quantitative

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Mr. John T. Brown
May 16, 1978
Page 2

estimates of this activity are available. The total number of visitors to the forest over the past three years was provided by the Forest Service.

1975 - 205,500 Visitor Days
1976 - 292,200 Visitor Days
1977 - 473,600 Visitor Days

The Florida Department of Natural Resources, Division of Recreation and Parks has produced the following table showing our projected estimates of demand for several recreational activities in our Administrative Region 8 which includes the Osceola National Forest.

Recreation Demand for the Year 1990

Activity	User Occasions
Freshwater Fishing	2,700,000
Picnicing	4,800,000
Nature Study	1,800,000
Recreational Vehicle Camping	800,000
Hiking	900,000
Tent Camping	300,000
Horseback Riding	6,700,000
Hunting	1,800,000

The resultant loss of approximately one-third of the land and recreational uses of Osceola National Forest from the proposed strip-mining would place additional stress on state and local governments to meet the recreational demand projected for 1990.

The National Environmental Protection Act is binding on the Department of Interior and requires protection of the environment for succeeding generations and for attainment of the widest range of beneficial uses of the environment without degradation. The proposed strip-mining of Osceola National Forest would be an extremely destructive activity and would be contrary to the intent of the act. Forest, wetlands, valuable wildlife habitat and productive topsoils would be lost or seriously disrupted if mining is permitted. The land which would be directly impaired by mining would not provide recreational benefits for many generations. It should be noted that, to date, the restoration/reclamation of strip-mined land is an inexact science, thus forest and wetlands located in the proposed leasing area may never be adequately restored even with an intensive management/reclamation process. Also, the chain-like ecological impacts and long term implications which are manifest in strip-mining phosphate in Florida are not fully understood or evident at this time.

Other adverse impacts directly or indirectly affecting recreational uses of the forest could occur as a result of strip-mining. An alteration of hydroperiods in water systems downstream from the mining operation could

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Mr. John T. Brown
May 16, 1978
Page 3

result from pumping hugh quantities of water required for mining. Such activities could lower the water table and reduce spring flow from the Floridian Aquifer into the Suwannee and Santa Fe Rivers, and affect springs like that found in Ichetucknee Springs State Park. Higher concentrations of suspended solids, flourides, phosphates, and sulfates would be received by streams carrying mining effluent. This potential pollution of water and any accompanying air pollution from mining operations could carry the detrimental effects far beyond the bounds of the mining site.

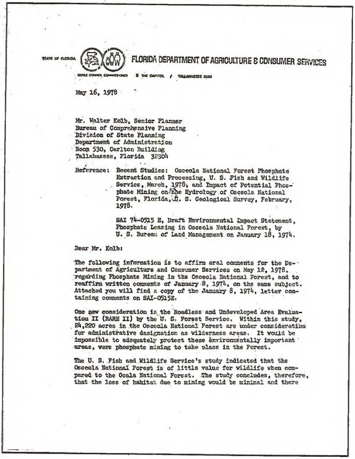
Strip-mining in Osceola National Forest appears to be a violation of Forest Service objectives for National Forest management. Strip-mining of the forest also appears to be in violation of the spirit of the Multiple Use-Sustained Yield Act of 1960. Most areas impacted by the mining may be only able to support one use after mining, that being restoration.

In reference to the wildlife restudy of the Osceola National Forest prepared for the Department of Interior, we offer this comment. The report states on page 273 that a 50 percent per area increase in visitor days would occur in the unmined section of the forest, resulting from a loss of the mined area for recreation use. This prediction in our opinion is merely conjecture, and an actual net decrease in the visitor days to Osceola National Forest would result from the area lost by mining.

In light of the short and long term adverse impacts that could occur to recreational and ecological resources from mining phosphate in the Osceola National Forest, the Florida Division of Recreation and Parks is opposed to the proposal.

Sincerely,

John R. Squire
Recreation Planner Supervisor
Bureau of Plans, Programs
and Services
Division of Recreation
and Parks.



STATE OF FLORIDA FLORIDA DEPARTMENT OF AGRICULTURE & CONSUMER SERVICES
DOYLE CONNER, COMMISSIONER THE CAPITOL / TALLAHASSEE 32304

May 16, 1978

Mr. Walter Kolb, Senior Planner
Bureau of Comprehensive Planning
Division of State Planning
Department of Administration
Room 530, Carlton Building
Tallahassee, Florida 32304

Reference: Recent Studies: Osceola National Forest Phosphate Extraction and Processing, U. S. Fish and Wildlife Service, March, 1978, and Impact of Potential Phosphate Mining on the Hydrology of Osceola National Forest, Florida, U. S. Geological Survey, February, 1978.

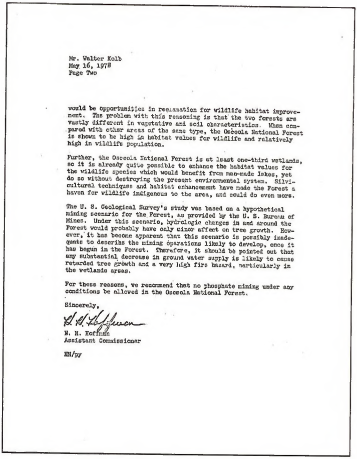
SAI 74-0515 E, Draft Environmental Impact Statement, Phosphate Leasing in Osceola National Forest, by U. S. Bureau of Land Management on January 18, 1974.

Dear Mr. Kolb:

The following information is to affirm oral comments for the Department of Agriculture and Consumer Services on May 12, 1978, regarding Phosphate Mining in the Osceola National Forest, and to reaffirm written comments of January 8, 1974, on the same subject. Attached you will find a copy of the January 8, 1974, letter containing comments on SAI-0515E.

One new consideration is the Roadless and Undeveloped Area Evaluation II (RARE II) by the U. S. Forest Service. Within this study, 24,220 acres in the Osceola National Forest are under consideration for administrative designation as wilderness areas. It would be impossible to adequately protect these environmentally important areas, were phosphate mining to take place in the Forest.

The U. S. Fish and Wildlife Service's study indicated that the Osceola National Forest is of little value for wildlife when compared to the Ocala National Forest. The study concludes, therefore, that the loss of habitat due to mining would be minimal and there



Mr. Walter Kolb
May 16, 1978
Page Two

would be opportunities in reclamation for wildlife habitat improvement. The problem with this reasoning is that the two forests are vastly different in vegetative and soil characteristics. When compared with other areas of the same type, the Osceola National Forest is shown to be high in habitat values for wildlife and relatively high in wildlife population.

Further, the Osceola National Forest is at least one-third wetlands, so it is already quite possible to enhance the habitat values for the wildlife species which would benefit from man-made lakes, yet do so without destroying the present environmental system. Silvicultural techniques and habitat enhancement have made the Forest a haven for wildlife indigenous to the area, and could do even more.

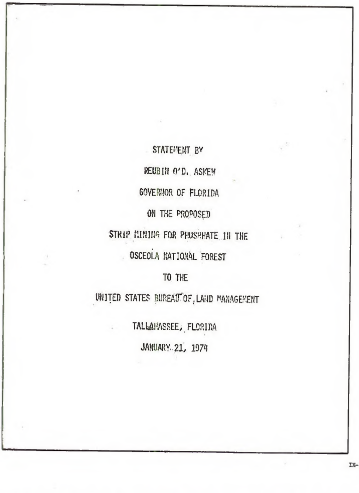
The U. S. Geological Survey's study was based on a hypothetical mining scenario for the Forest, as provided by the U. S. Bureau of Mines. Under this scenario, hydrologic changes in and around the Forest would probably have only minor affect on tree growth. However, it has become apparent that this scenario is possibly inadequate to describe the mining operations likely to develop, once it has begun in the Forest. Therefore, it should be pointed out that any substantial decrease in ground water supply is likely to cause retarded tree growth and a very high fire hazard, particularly in the wetlands areas.

For these reasons, we recommend that no phosphate mining under any conditions be allowed in the Osceola National Forest.

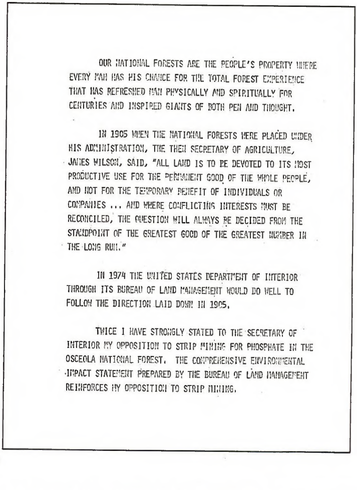
Sincerely,

N. H. Hoffman
Assistant Commissioner

NH/py



STATEMENT BY
REUBIN O'D. ASKEW
GOVERNOR OF FLORIDA
ON THE PROPOSED
STRIP MINING FOR PHOSPHATE IN THE
OSCEOLA NATIONAL FOREST
TO THE
UNITED STATES BUREAU OF LAND MANAGEMENT
TALLAHASSEE, FLORIDA
JANUARY 21, 1974

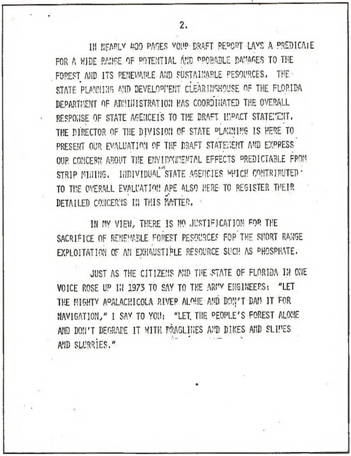


OUR NATIONAL FORESTS ARE THE PEOPLE'S PROPERTY WHERE EVERY MAN HAS HIS CHANCE FOR THE TOTAL FOREST EXPERIENCE THAT HAS REFRESHED MAN PHYSICALLY AND SPIRITUALLY FOR CENTURIES AND INSPIRED GIANTS OF BOTH PEN AND THOUGHT.

IN 1905 WHEN THE NATIONAL FORESTS WERE PLACED UNDER HIS ADMINISTRATION, THE THEN SECRETARY OF AGRICULTURE, JAMES WILSON, SAID, "ALL LAND IS TO BE DEVOTED TO ITS MOST PRODUCTIVE USE FOR THE PERMANENT GOOD OF THE WHOLE PEOPLE, AND NOT FOR THE TEMPORARY BENEFIT OF INDIVIDUALS OR COMPANIES ... AND WHERE CONFLICTING INTERESTS MUST BE RECONCILED, THE QUESTION WILL ALWAYS BE DECIDED FROM THE STANDPOINT OF THE GREATEST GOOD OF THE GREATEST NUMBER IN THE LONG RUN."

IN 1974 THE UNITED STATES DEPARTMENT OF INTERIOR THROUGH ITS BUREAU OF LAND MANAGEMENT WOULD DO WELL TO FOLLOW THE DIRECTION LAID DOWN IN 1905.

TWICE I HAVE STRONGLY STATED TO THE SECRETARY OF INTERIOR MY OPPOSITION TO STRIP MINING FOR PHOSPHATE IN THE OSCEOLA NATIONAL FOREST. THE COMPREHENSIVE ENVIRONMENTAL IMPACT STATEMENT PREPARED BY THE BUREAU OF LAND MANAGEMENT REINFORCES MY OPPOSITION TO STRIP MINING.

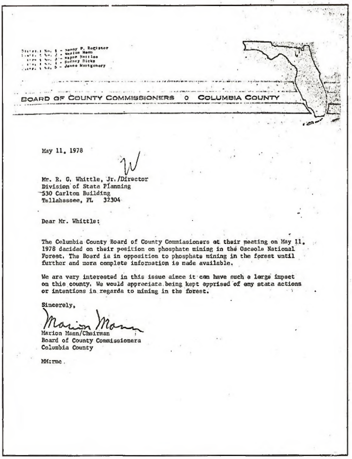


2.

IN NEARLY 400 PAGES YOUR DRAFT REPORT LAYS A PREDICATE FOR A WIDE RANGE OF POTENTIAL AND PROBABLE DAMAGES TO THE FOREST AND ITS RENEWABLE AND SUSTAINABLE RESOURCES. THE STATE PLANNING AND DEVELOPMENT CLEARINGHOUSE OF THE FLORIDA DEPARTMENT OF ADMINISTRATION HAS COORDINATED THE OVERALL RESPONSE OF STATE AGENCEIS TO THE DRAFT IMPACT STATEMENT. THE DIRECTOR OF THE DIVISION OF STATE PLANNING IS HERE TO PRESENT OUR EVALUATION OF THE DRAFT STATEMENT AND EXPRESS OUR CONCERN ABOUT THE ENVIRONMENTAL EFFECTS PREDICTABLE FROM STRIP MINING. INDIVIDUAL STATE AGENCIES WHICH CONTRIBUTED TO THE OVERALL EVALUATION ARE ALSO HERE TO REGISTER THEIR DETAILED CONCERNS IN THIS MATTER.

IN MY VIEW, THERE IS NO JUSTIFICATION FOR THE SACRIFICE OF RENEWABLE FOREST RESOURCES FOR THE SHORT RANGE EXPLOITATION OF AN EXHAUSTIBLE RESOURCE SUCH AS PHOSPHATE.

JUST AS THE CITIZENS AND THE STATE OF FLORIDA IN ONE VOICE ROSE UP IN 1973 TO SAY TO THE ARMY ENGINEERS: "LET THE MIGHTY APALACHICOLA RIVER ALONE AND DON'T DAM IT FOR NAVIGATION," I SAY TO YOU: "LET THE PEOPLE'S FOREST ALONE AND DON'T DEGRADE IT WITH DRAGLINES AND DIKES AND SLIMES AND SLURRIES."



District No. 1 - Ramey P. Register
District No. 2 - Marion Mann
District No. 3 - Wayne Nettles
District No. 4 - Rodney Dicks
District No. 5 - James Montgomery

BOARD OF COUNTY COMMISSIONERS o COLUMBIA COUNTY

May 11, 1978

W

Mr. R. G. Whittle, Jr./Director
Division of State Planning
530 Carlton Building
Tallahassee, FL 32304

Dear Mr. Whittle:

The Columbia County Board of County Commissioners at their meeting on May 11, 1978 decided on their position on phosphate mining in the Osceola National Forest. The Board is in opposition to phosphate mining in the forest until further and more complete information is made available.

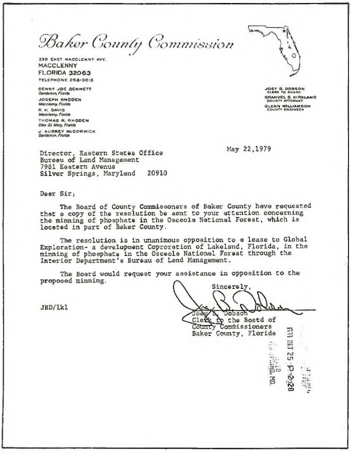
We are very interested in this issue since it can have such a large impact on this county. We would appreciate being kept apprised of any state actions or intentions in regards to mining in the forest.

Sincerely,

Marion Mann

Marion Mann/Chairman
Board of County Commissioners
Columbia County

MM:rmc



Baker County Commission

338 EAST MACCLENNY AVE.
MACCLENNY
FLORIDA 32063
TELEPHONE 259-3613

BENNY JOE BENNETT
Sanderson, Florida
JOSEPH RHODEN
Macclenny, Florida
R. H. DAVIS
Macclenny, Florida
THOMAS R. RHODEN
Glen St. Mary, Florida
J. AUBREY McCORMICK
Sanderson, Florida

JOEY B. DOBSON
CLERK TO BOARD
GRANVEL S. KIRKLAND
COUNTY ATTORNEY
GLENN WILLIAMSON
COUNTY ENGINEER

May 22,1979

Director, Eastern States Office
Bureau of Land Management
7981 Eastern Avenue
Silver Springs, Maryland 20910

Dear Sir;

The Board of County Commissoners of Baker County have requested that a copy of the resolution be sent to your attention concerning the minning of phosphate in the Osceola National Forest, which is located in part of Baker County.

The resolution is in unanimous opposition to a lease to Global Exploration- a development Coproration of Lakeland, Florida, in the minning of phosphate in the Osceola National Forest through the Interior Department's Bureau of Land Management.

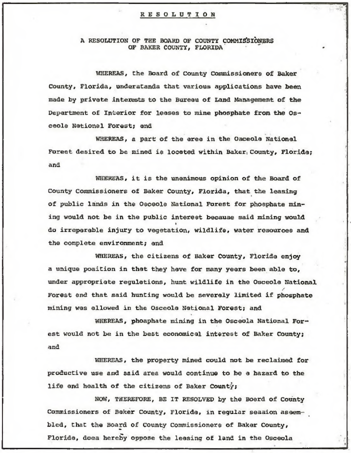
The Board would request your assistance in opposition to the proposed minning.

Sincerely,

Joey B. Dobson
Clerk to the Boatd of
County Commissioners
Baker County, Florida

JBD/lkl

MAY 25 P 2:28
SPRING, MD.



R E S O L U T I O N

A RESOLUTION OF THE BOARD OF COUNTY COMMISSIONERS OF BAKER COUNTY, FLORIDA

WHEREAS, the Board of County Commissioners of Baker County, Florida, understands that various applications have been made by private interests to the Bureau of Land Management of the Department of Interior for leases to mine phosphate from the Osceola National Forest; and

WHEREAS, a part of the area in the Osceola National Forest desired to be mined is located within Baker County, Florida; and

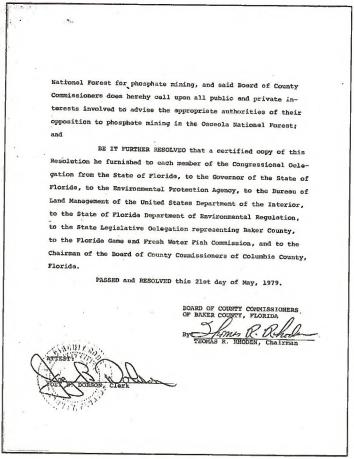
WHEREAS, it is the unanimous opinion of the Board of County Commissioners of Baker County, Florida, that the leasing of public lands in the Osceola National Forest for phosphate mining would not be in the public interest because said mining would do irreparable injury to vegetation, wildlife, water resources and the complete environment; and

WHEREAS, the citizens of Baker County, Florida enjoy a unique position in that they have for many years been able to, under appropriate regulations, hunt wildlife in the Osceola National Forest and that said hunting would be severely limited if phosphate mining was allowed in the Osceola National Forest; and

WHEREAS, phosphate mining in the Osceola National Forest would not be in the best economical interest of Baker County; and

WHEREAS, the property mined could not be reclaimed for productive use and said area would continue to be a hazard to the life and health of the citizens of Baker County;

NOW, THEREFORE, BE IT RESOLVED by the Board of County Commissioners of Baker County, Florida, in regular session assembled, that the Board of County Commissioners of Baker County, Florida, does hereby oppose the leasing of land in the Osceola



National Forest for phosphate mining, and said Board of County Commissioners does hereby call upon all public and private interests involved to advise the appropriate authorities of their opposition to phosphate mining in the Osceola National Forest; and

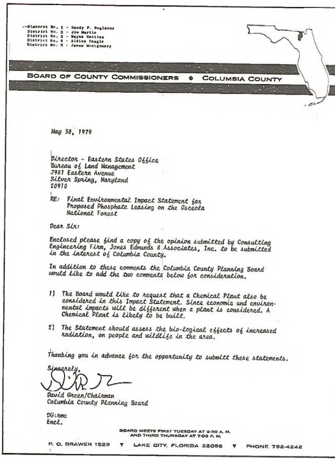
BE IT FURTHER RESOLVED that a certified copy of this Resolution be furnished to each member of the Congressional Delegation from the State of Florida, to the Governor of the State of Florida, to the Environmental Protection Agency, to the Bureau of Land Management of the United States Department of the Interior, to the State of Florida Department of Environmental Regulation, to the State Legislative Delegation representing Baker County, to the Florida Game and Fresh Water Fish Commission, and to the Chairman of the Board of County Commissioners of Columbia County, Florida.

PASSED and RESOLVED this 21st day of May, 1979.

BOARD OF COUNTY COMMISSIONERS
OF BAKER COUNTY, FLORIDA

By Thomas R. Rhoden
THOMAS R. RHODEN, Chairman

ATTEST:
JOEY B. DOBSON, Clerk



District No. 1 - Beedy P. Register
District No. 2 - Jim Martin
District No. 3 - Wayne Nettles
District No. 4 - Aldion Feagle
District No. 5 - James Montgomery

BOARD OF COUNTY COMMISSIONERS • COLUMBIA COUNTY

May 30, 1979

Director - Eastern States Office
Bureau of Land Management
7981 Eastern Avenue
Silver Spring, Maryland
20910

RE: Final Environmental Impact Statement for
Proposed Phosphate Leasing on the Osceola
National Forest

Dear Sir:

Enclosed please find a copy of the opinion submitted by Consulting Engineering Firm, Jones Edmunds & Associates, Inc. to be submitted in the interest of Columbia County.

In addition to these comments the Columbia County Planning Board would like to add the two comments below for consideration.

1) The Board would like to request that a Chemical Plant also be considered in this Impact Statement. Since economic and environmental impacts will be different when a plant is considered. A Chemical Plant is likely to be built.

2) The Statement should assess the bio-logical effects of increased radiation, on people and wildlife in the area.

Thanking you in advance for the opportunity to submitt these statements.

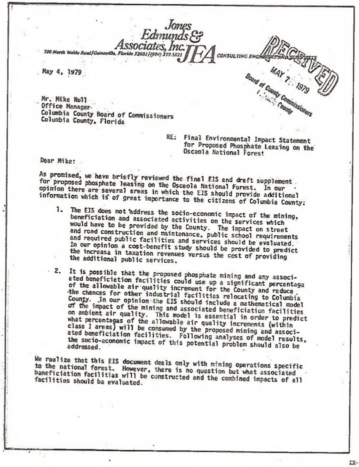
Sincerely,

David Green/Chairman
Columbia County Planning Board

DG:rmc
Encl.

BOARD MEETS FIRST TUESDAY AT 9:30 A. M.
AND THIRD THURSDAY AT 7:00 P. M.

P. O. DRAWER 1529 ▼ LAKE CITY, FLORIDA 32056 ▼ PHONE 752-4242



Jones
Edmunds &
Associates, Inc.
730 North Waldo Road/Gainesville, Florida 32601/(904) 377-5821 JEA CONSULTING ENGINEERS AND SCIENTISTS

RECEIVED
MAY 7 1979
Board of County Commissioners
Columbia County

May 4, 1979

Mr. Mike Null
Office Manager
Columbia County Board of Commissioners
Columbia County, Florida

RE: Final Environmental Impact Statement
for Proposed Phosphate Leasing on the
Oscaola National Forest

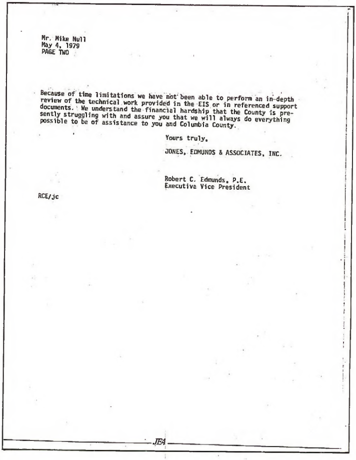
Dear Mike:

As promised, we have briefly reviewed the final EIS and draft supplement for proposed phosphate leasing on the Osceola National Forest. In our opinion there are several areas in which the EIS should provide additional information which is of great importance to the citizens of Columbia County:

1. The EIS does not address the socio-economic impact of the mining, beneficiation and associated activities on the services which would have to be provided by the County. The impact on street and road construction and maintenance, public school requirements and required public facilities and services should be evaluated. In our opinion a cost-benefit study should be provided to predict the increase in taxation revenues versus the cost of providing the additional public services.

2. It is possible that the proposed phosphate mining and any associated beneficiation facilities could use up a significant percentage of the allowable air quality increment for the County and reduce the chances for other industrial facilities relocating to Columbia County. In our opinion the EIS should include a mathematical model of the impact of the mining and associated beneficiation facilities on ambient air quality. This model is essential in order to predict what percentages of the allowable air quality increments (within class I areas) will be consumed by the proposed mining and associated beneficiation facilities. Following analyses of model results, the socio-economic impact of this potential problem should also be addressed.

We realize that this EIS document deals only with mining operations specific to the national forest. However, there is no question but what associated beneficiation facilities will be constructed and the combined impacts of all facilities should be evaluated.



Mr. Mike Null
May 4, 1979
PAGE TWO

Because of time limitations we have not been able to perform an in-depth review of the technical work provided in the EIS or in referenced support documents. We understand the financial hardship that the County is presently struggling with and assure you that we will always do everything possible to be of assistance to you and Columbia County.

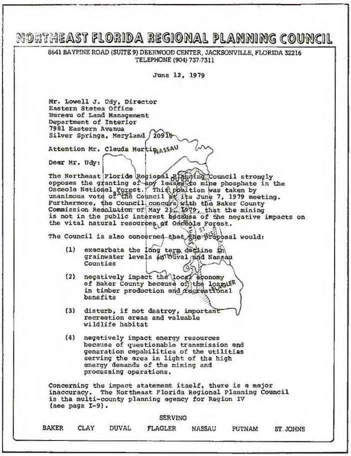
Yours truly,

JONES, EDMUNDS & ASSOCIATES, INC.

Robert C. Edmunds, P.E.
Executive Vice President

RCE/jc

JEA



NORTHEAST FLORIDA REGIONAL PLANNING COUNCIL
8641 BAYPINE ROAD (SUITE 9) DEERWOOD CENTER, JACKSONVILLE, FLORIDA 32216
TELEPHONE (904) 737-7311

June 12, 1979

Mr. Lowell J. Udy, Director
Eastern States Office
Bureau of Land Management
Department of Interior
7981 Eastern Avenue
Silver Springs, Maryland 20910

Attention Mr. Claude Martin

Dear Mr. Udy:

The Northeast Florida Regional Planning Council strongly opposes the granting of any leases to mine phosphate in the Osceola National Forest. This position was taken by unanimous vote of the Council at its June 7, 1979 meeting. Furthermore, the Council concurs with the Baker County Commission Resolution of May 21, 1979, that the mining is not in the public interest because of the negative impacts on the vital natural resources of Osceola Forest.

The Council is also concerned that the proposal would:

(1) exacerbate the long term decline in groundwater levels in Duval and Nassau Counties

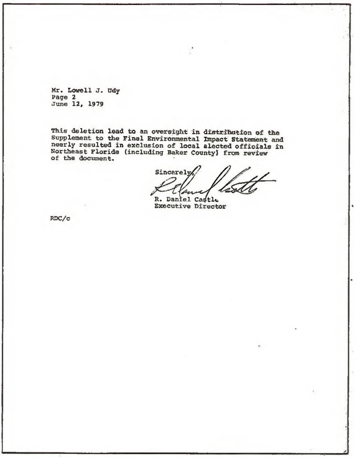
(2) negatively impact the local economy of Baker County because of the loss in timber production and recreational benefits

(3) disturb, if not destroy, important recreation areas and valuable wildlife habitat

(4) negatively impact energy resources because of questionable transmission and generation capabilities of the utilities serving the area in light of the high energy demands of the mining and processing operations.

Concerning the impact statement itself, there is a major inaccuracy. The Northeast Florida Regional Planning Council is the multi-county planning agency for Region IV (see page I-9).

SERVING
BAKER CLAY DUVAL FLAGLER NASSAU PUTNAM ST. JOHNS



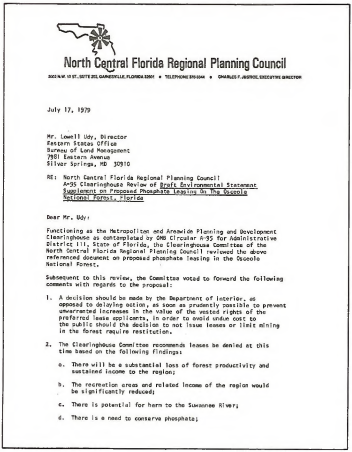
Mr. Lowell J. Udy
Page 2
June 12, 1979

This deletion lead to an oversight in distribution of the Supplement to the Final Environmental Impact Statement and nearly resulted in exclusion of local elected officials in Northeast Florida (including Baker County) from review of the document.

Sincerely,

R. Daniel Castle
Executive Director

RDC/c



North Central Florida Regional Planning Council
2002 N.W. 13 ST., SUITE 202, GAINESVILLE, FLORIDA 32601 • TELEPHONE 376-3344 • CHARLES F. JUSTICE, EXECUTIVE DIRECTOR

July 17, 1979

Mr. Lowell Udy, Director
Eastern States Office
Bureau of Land Management
7981 Eastern Avenue
Silver Springs, MD 30910

RE: North Central Florida Regional Planning Council
A-95 Clearinghouse Review of Draft Environmental Statement Supplement on Proposed Phosphate Leasing On The Osceola National Forest, Florida

Dear Mr. Udy:

Functioning as the Metropolitan and Areawide Planning and Development Clearinghouse as contemplated by OMB Circular A-95 for Administrative District III, State of Florida, the Clearinghouse Committee of the North Central Florida Regional Planning Council reviewed the above referenced document on proposed phosphate leasing in the Osceola National Forest.

Subsequent to this review, the Committee voted to forward the following comments with regards to the proposal:

1. A decision should be made by the Department of Interior, as opposed to delaying action, as soon as prudently possible to prevent unwarranted increases in the value of the vested rights of the preferred lease applicants, in order to avoid undue cost to the public should the decision to not issue leases or limit mining in the forest require restitution.

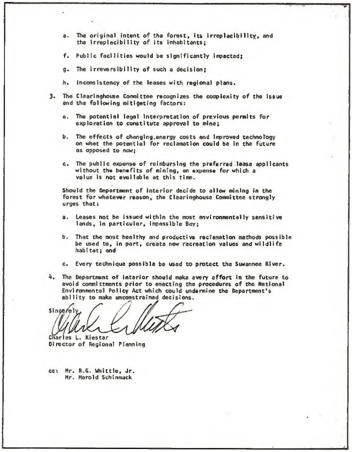
2. The Clearinghouse Committee recommends leases be denied at this time based on the following findings:

   a. There will be a substantial loss of forest productivity and sustained income to the region;

   b. The recreation areas and related income of the region would be significantly reduced;

   c. There is potential for harm to the Suwannee River;

   d. There is a need to conserve phosphate;



   a. The original intent of the forest, its irreplacibility, and the irreplacibility of its inhabitants;

   f. Public facilities would be significantly impacted;

   g. The irreversibility of such a decision;

   h. Inconsistency of the leases with regional plans.

3. The Clearinghouse Committee recognizes the complexity of the issue and the following mitigating factors:

   a. The potential legal interpretation of previous permits for exploration to constitute approval to mine;

   b. The effects of changing energy costs and improved technology on what the potential for reclamation could be in the future as opposed to now;

   c. The public expense of reimbursing the preferred lease applicants without the benefits of mining, an expense for which a value is not available at this time.

   Should the Department of Interior decide to allow mining in the forest for whatever reason, the Clearinghouse Committee strongly urges that:

   a. Leases not be issued within the most environmentally sensitive lands, in particular, Impassible Bay;

   b. That the most healthy and productive reclamation methods possible be used to, in part, create new recreation values and wildlife habitat; and

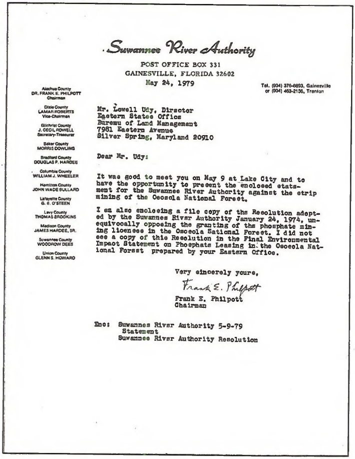
   c. Every technique possible be used to protect the Suwannee River.

4. The Department of Interior should make every effort in the future to avoid committments prior to enacting the procedures of the National Environmental Policy Act which could undermine the Department's ability to make unconstrained decisions.

Sincerely,

Charles L. Kiester
Director of Regional Planning

cc: Mr. R.G. Whittle, Jr.
Mr. Harold Schinmack



Suwannee River Authority

POST OFFICE BOX 331
GAINESVILLE, FLORIDA 32602

May 24, 1979

Tel. (904) 376-6893, Gainesville
or (904) 463-2136, Trenton

Alachua County
DR. FRANK E. PHILPOTT
Chairman

Dixie County
LAMAR ROBERTS
Vice-Chairman

Gilchrist County
J. CECIL ROWELL
Secretary-Treasurer

Baker County
MORRIS DOWLING

Bradford County
DOUGLAS P. HARDEE

Columbia County
WILLIAM J. WHEELER

Hamilton County
JOHN WADE BULLARD

Lafayette County
G. B. O'STEEN

Levy County
THOMAS BROOKINS

Madison County
JAMES HARDEE, SR.

Suwannee County
WOODROW DEES

Union County
GLENN S. HOWARD

Mr. Lowell Udy, Director
Eastern States Office
Bureau of Land Management
7981 Eastern Avenue
Silver Spring, Maryland 20910

Dear Mr. Udy:

It was good to meet you on May 9 at Lake City and to have the opportunity to present the enclosed statement for the Suwannee River Authority against the strip mining of the Osceola National Forest.

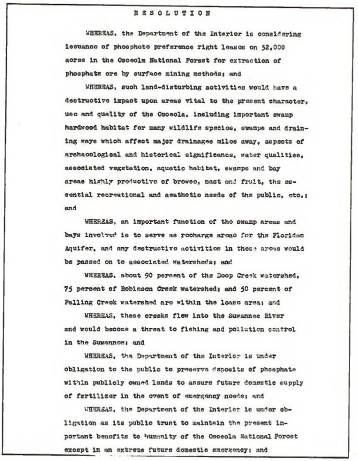
I am also enclosing a file copy of the Resolution adopted by the Suwannee River Authority January 24, 1974, unequivocally opposing the granting of the phosphate mining licenses in the Osceola National Forest. I did not see a copy of this Resolution in the Final Environmental Impact Statement on Phosphate Leasing in the Osceola National Forest prepared by your Eastern Office.

Very sincerely yours,

Frank E. Philpott

Frank E. Philpott
Chairman

Enc: Suwannee River Authority 5-9-79
Statement
Suwannee River Authority Resolution



RESOLUTION

WHEREAS, the Department of the Interior is considering issuance of phosphate preference right leases on 52,000 acres in the Osceola National Forest for extraction of phosphate ore by surface mining methods; and

WHEREAS, such land-disturbing activities would have a destructive impact upon areas vital to the present character, use and quality of the Osceola, including important swamp hardwood habitat for many wildlife species, swamps and draining ways which affect major drainages miles away, aspects of archaeological and historical significance, water qualities, associated vegetation, aquatic habitat, swamps and bay areas highly productive of browse, mast and fruit, the essential recreational and aesthetic needs of the public, etc.; and

WHEREAS, an important function of the swamp areas and bays involved is to serve as recharge areas for the Floridan Aquifer, and any destructive activities in these areas would be passed on to associated watersheds; and

WHEREAS, about 90 percent of the Deep Creek watershed, 75 percent of Robinson Creek watershed; and 50 percent of Falling Creek watershed are within the lease area; and

WHEREAS, these creeks flow into the Suwannee River and would become a threat to fishing and pollution control in the Suwannee; and

WHEREAS, the Department of the Interior is under obligation to the public to preserve deposits of phosphate within publicly owned lands to assure future domestic supply of fertilizer in the event of emergency needs; and

WHEREAS, the Department of the Interior is under obligation as its public trust to maintain the present important benefits to humanity of the Osceola National Forest except in an extreme future domestic emergency; and

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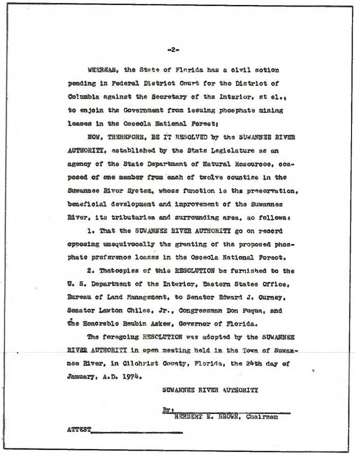


-2-

WHEREAS, the State of Florida has a civil action pending in Federal District Court for the District of Columbia against the Secretary of the Interior, et al., to enjoin the Government from issuing phosphate mining leases in the Osceola National Forest;

NOW, THEREFORE, BE IT RESOLVED by the SUWANNEE RIVER AUTHORITY, established by the State Legislature as an agency of the State Department of Natural Resources, composed of one member from each of twelve counties in the Suwannee River System, whose function is the preservation, beneficial development and improvement of the Suwannee River, its tributaries and surrounding area, as follows:

1. That the SUWANNEE RIVER AUTHORITY go on record opposing unequivocally the granting of the proposed phosphate preference leases in the Osceola National Forest.

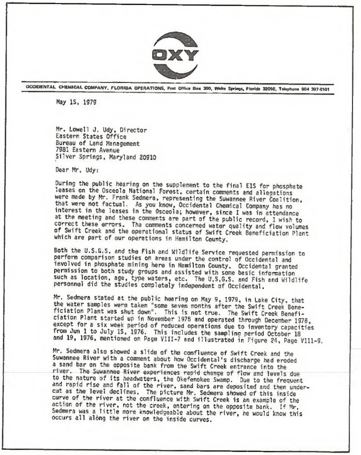
2. That copies of this RESOLUTION be furnished to the U. S. Department of the Interior, Eastern States Office, Bureau of Land Management, to Senator Edward J. Gurney, Senator Lawton Chiles, Jr., Congressman Don Fuqua, and the Honorable Reubin Askew, Governor of Florida.

The foregoing RESOLUTION was adopted by the SUWANNEE RIVER AUTHORITY in open meeting held in the Town of Suwannee River, in Gilchrist County, Florida, the 24th day of January, A.D. 1974.

SUWANNEE RIVER AUTHORITY

By: ______________________
HERBERT E. BROWN, Chairman

ATTEST______________________



OXY

OCCIDENTAL CHEMICAL COMPANY, FLORIDA OPERATIONS, Post Office Box 300, White Springs, Florida 32096, Telephone 904 397-8101

May 15, 1979

Mr. Lowell J. Udy, Director
Eastern States Office
Bureau of Land Management
7981 Eastern Avenue
Silver Springs, Maryland 20910

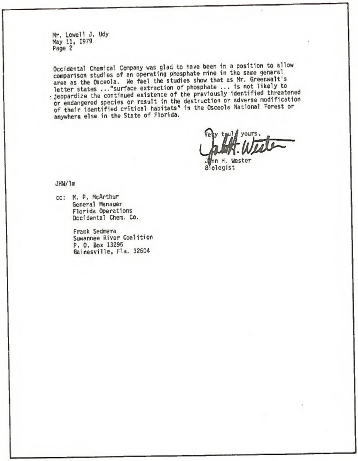
Dear Mr. Udy:

During the public hearing on the supplement to the final EIS for phosphate leases on the Osceola National Forest, certain comments and allegations were made by Mr. Frank Sedmera, representing the Suwannee River Coalition, that were not factual. As you know, Occidental Chemical Company has no interest in the leases in the Osceola; however, since I was in attendance at the meeting and these comments are part of the public record, I wish to correct these errors. The comments concerned water quality and flow volumes of Swift Creek and the operational status of Swift Creek Beneficiation Plant which are part of our operations in Hamilton County.

Both the U.S.G.S. and the Fish and Wildlife Service requested permission to perform comparison studies on areas under the control of Occidental and involved in phosphate mining here in Hamilton County. Occidental granted permission to both study groups and assisted with some basic information such as location, age, type waters, etc. The U.S.G.S. and Fish and Wildlife personnel did the studies completely independent of Occidental.

Mr. Sedmera stated at the public hearing on May 9, 1979, in Lake City, that the water samples were taken "some seven months after the Swift Creek Beneficiation Plant was shut down". This is not true. The Swift Creek Beneficiation Plant started up in November 1975 and operated through December 1976, except for a six week period of reduced operations due to inventory capacities from Jun 1 to July 15, 1976. This includes the sampling period October 18 and 19, 1976, mentioned on Page VIII-7 and illustrated in Figure 24, Page VIII-9.

Mr. Sedmera also showed a slide of the confluence of Swift Creek and the Suwannee River with a comment about how Occidental's discharge had eroded a sand bar on the opposite bank from the Swift Creek entrance into the river. The Suwannee River experiences rapid change of flow and levels due to the nature of its headwaters, the Okefenokee Swamp. Due to the frequent and rapid rise and fall of the river, sand bars are deposited and then undercut as the level declines. The picture Mr. Sedmera showed of this inside curve of the river at the confluence with Swift Creek is an example of the action of the river, not the creek, entering on the opposite bank. If Mr. Sedmera was a little more knowledgeable about the river, he would know this occurs all along the river on the inside curves.



Mr. Lowell J. Udy
May 11, 1979
Page 2

Occidental Chemical Company was glad to have been in a position to allow comparison studies of an operating phosphate mine in the same general area as the Osceola. We feel the studies show that as Mr. Greenwalt's letter states ..."surface extraction of phosphate ... is not likely to jeopardize the continued existence of the previously identified threatened or endangered species or result in the destruction or adverse modification of their identified critical habitats" in the Osceola National Forest or anywhere else in the State of Florida.

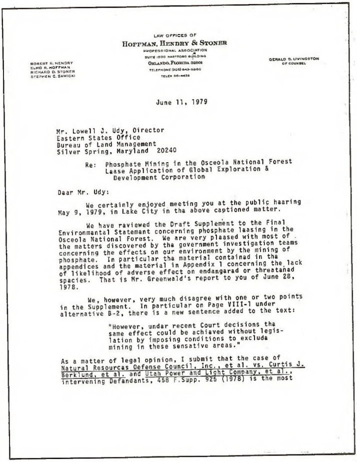
Very truly yours,

John H. Wester
Biologist

JHW/lm

cc: M. P. McArthur
General Manager
Florida Operations
Occidental Chem. Co.

Frank Sedmera
Suwannee River Coalition
P. O. Box 13295
Gainesville, Fla. 32604



LAW OFFICES OF
HOFFMAN, HENDRY & STONER
PROFESSIONAL ASSOCIATION
SUITE 1800 HARTFORD BUILDING
ORLANDO, FLORIDA 32801
TELEPHONE (305) 843-5880
TELEX 56-4439

ROBERT R. HENDRY
ELMO R. HOFFMAN
RICHARD D. STONER
STEPHEN C. SAWICKI

GERALD S. LIVINGSTON
OF COUNSEL

June 11, 1979

Mr. Lowell J. Udy, Director
Eastern States Office
Bureau of Land Management
Silver Spring, Maryland 20240

Re: Phosphate Mining in the Osceola National Forest
Lease Application of Global Exploration &
Development Corporation

Dear Mr. Udy:

We certainly enjoyed meeting you at the public hearing May 9, 1979, in Lake City in the above captioned matter.

We have reviewed the Draft Supplement to the Final Environmental Statement concerning phosphate leasing in the Osceola National Forest. We are very pleased with most of the matters discovered by the government investigation teams concerning the effects on our environment by the mining of phosphate. In particular the material contained in the appendices and the material in Appendix 1 concerning the lack of likelihood of adverse effect on endangered or threatened species. That is Mr. Greenwald's report to you of June 28, 1978.

We, however, very much disagree with one or two points in the Supplement. In particular on Page VIII-1 under alternative B-2, there is a new sentence added to the text:

> "However, under recent Court decisions the same effect could be achieved without legislation by imposing conditions to exclude mining in these sensative areas."

As a matter of legal opinion, I submit that the case of Natural Resources Defense Council, Inc., et al. vs. Curtis J. Berklund, et al. and Utah Power and Light Company, et al., intervening Defendants, 458 F.Supp. 925 (1978) is the most

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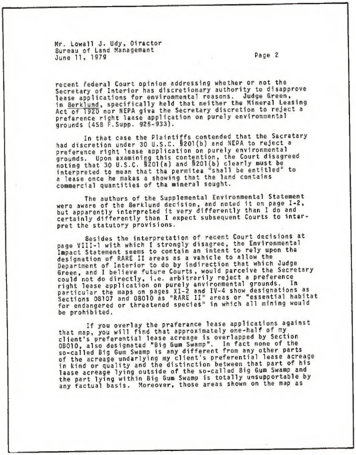

Mr. Lowell J. Udy, Director
Bureau of Land Management
June 11, 1979

Page 2

recent federal Court opinion addressing whether or not the Secretary of Interior has discretionary authority to disapprove lease applications for environmental reasons. Judge Green, in Berklund, specifically held that neither the Mineral Leasing Act of 1920 nor NEPA give the Secretary discretion to reject a preference right lease application on purely environmental grounds (458 F.Supp. 925-933).

In that case the Plaintiffs contended that the Secretary had discretion under 30 U.S.C. §201(b) and NEPA to reject a preference right lease application on purely environmental grounds. Upon examining this contention, the Court disagreed noting that 30 U.S.C. §201(a) and §201(b) clearly must be interpreted to mean that the permitee "shall be entitled" to a lease once he makes a showing that the land contains commercial quantities of the mineral sought.

The authors of the Supplemental Environmental Statement were aware of the Berklund decision, and noted it on page I-2, but apparently interpreted it very differently than I do and certainly differently than I expect subsequent Courts to interpret the statutory provisions.

Besides the interpretation of recent Court decisions at page VIII-1 with which I strongly disagree, the Environmental Impact Statement seems to contain an intent to rely upon the designation of RARE II areas as a vehicle to allow the Department of Interior to do by indirection that which Judge Green, and I believe future Courts, would perceive the Secretary could not do directly, i.e. arbitrarily reject a preference right lease application on purely environmental grounds. In particular the maps on pages XI-2 and IV-4 show designations as Sections 08107 and 08010 as "RARE II" areas or "essential habitat for endangered or threatened species" in which all mining would be prohibited.

If you overlay the preference lease applications against that map, you will find that approximately one-half of my client's preferential lease acreage is overlapped by Section 08010, also designated "Big Gum Swamp". In fact none of the so-called Big Gum Swamp is any different from any other parts of the acreage underlying my client's preferential lease acreage in kind or quality and the distinction between that part of his lease acreage lying outside of the so-called Big Gum Swamp and the part lying within Big Gum Swamp is totally unsupportable by any factual basis. Moreover, those areas shown on the map as

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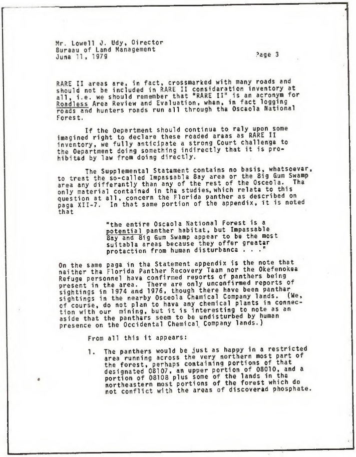


Mr. Lowell J. Udy, Director
Bureau of Land Management
June 11, 1979

Page 3

RARE II areas are, in fact, crossmarked with many roads and should not be included in RARE II consideration inventory at all, i.e. we should remember that "RARE II" is an acronym for Roadless Area Review and Evaluation, when, in fact logging roads and hunters roads run all through the Osceola National Forest.

If the Department should continue to rely upon some imagined right to declare these roaded areas as RARE II inventory, we fully anticipate a strong Court challenge to the Department doing something indirectly that it is prohibited by law from doing directly.

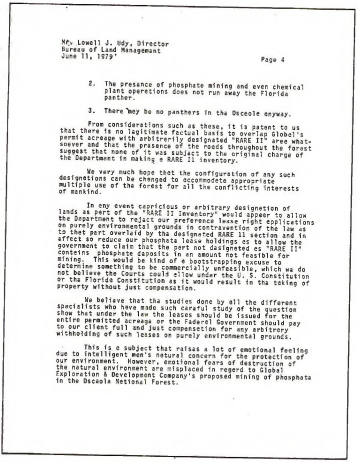
The Supplemental Statement contains no basis, whatsoever, to treat the so-called Impassable Bay area or the Big Gum Swamp area any differently than any of the rest of the Osceola. The only material contained in the studies, which relate to this question at all, concern the Florida panther as described on page XII-7. In that same portion of the appendix, it is noted that

> "the entire Osceola National Forest is a potential panther habitat, but Impassable Bay and Big Gum Swamp appear to be the most suitable areas because they offer greater protection from human disturbance . . ."

On the same page in the Statement appendix is the note that neither the Florida Panther Recovery Team nor the Okefenokee Refuge personnel have confirmed reports of panthers being present in the area. There are only unconfirmed reports of sightings in 1974 and 1976, though there have been panther sightings in the nearby Osceola Chemical Company lands. (We, of course, do not plan to have any chemical plants in connection with our mining, but it is interesting to note as an aside that the panthers seem to be undisturbed by human presence on the Occidental Chemical Company lands.)

From all this it appears:

1. The panthers would be just as happy in a restricted area running across the very northern most part of the forest, perhaps containing portions of that designated 08107, an upper portion of 08010, and a portion of 08108 plus some of the lands in the northeastern most portions of the forest which do not conflict with the areas of discovered phosphate.



Mr. Lowell J. Udy, Director
Bureau of Land Management
June 11, 1979

Page 4

2. The presence of phosphate mining and even chemical plant operations does not run away the Florida panther.

3. There may be no panthers in the Osceola anyway.

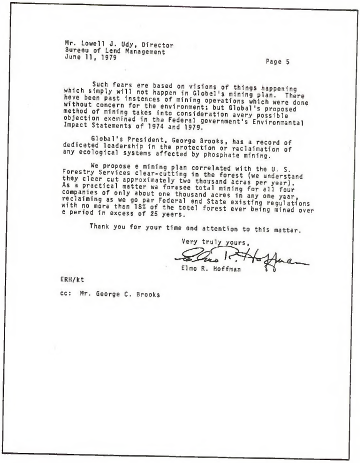
From considerations such as these, it is patent to us that there is no legitimate factual basis to overlap Global's permit acreage with arbitrarily designated "RARE II" area whatsoever and that the presence of the roads throughout the forest suggest that none of it was subject to the original charge of the Department in making a RARE II inventory.

We very much hope that the configuration of any such designations can be changed to accommodate appropriate multiple use of the forest for all the conflicting interests of mankind.

In any event capricious or arbitrary designation of lands as part of the "RARE II Inventory" would appear to allow the Department to reject our preference lease right applications on purely environmental grounds in contravention of the law as to that part overlaid by the designated RARE II section and in affect so reduce our phosphate lease holdings as to allow the government to claim that the part not designated as "RARE II" contains phosphate deposits in an amount not feasible for mining. This would be kind of a bootstrapping excuse to determine something to be commercially unfeasible, which we do not believe the Courts could allow under the U. S. Constitution or the Florida Constitution as it would result in the taking of property without just compensation.

We believe that the studies done by all the different specialists who have made such careful study of the question show that under the law the leases should be issued for the entire permitted acreage or the Federal Government should pay to our client full and just compensation for any arbitrary withholding of such leases on purely environmental grounds.

This is a subject that raises a lot of emotional feeling due to intelligent men's natural concern for the protection of our environment. However, emotional fears of destruction of the natural environment are misplaced in regard to Global Exploration & Development Company's proposed mining of phosphate in the Osceola National Forest.



Mr. Lowell J. Udy, Director
Bureau of Land Management
June 11, 1979

Page 5

Such fears are based on visions of things happening which simply will not happen in Global's mining plan. There have been past instances of mining operations which were done without concern for the environment; but Global's proposed method of mining takes into consideration every possible objection examined in the Federal government's Environmental Impact Statements of 1974 and 1979.

Global's President, George Brooks, has a record of dedicated leadership in the protection or reclaimation of any ecological systems affected by phosphate mining.

We propose a mining plan correlated with the U. S. Forestry Services clear-cutting in the forest (we understand they clear cut approximately two thousand acres per year). As a practical matter we foresee total mining for all four companies of only about one thousand acres in any one year, reclaiming as we go per Federal and State existing regulations with no more than 18% of the total forest ever being mined over a period in excess of 25 years.

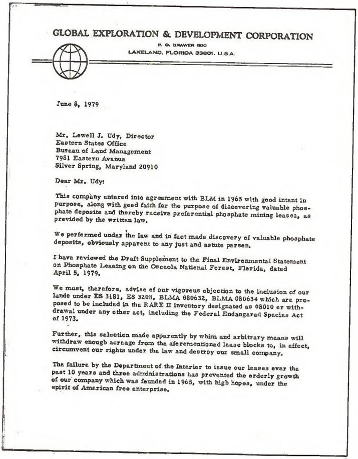
Thank you for your time and attention to this matter.

Very truly yours,

Elmo R. Hoffman

ERH/kt

cc: Mr. George C. Brooks



GLOBAL EXPLORATION & DEVELOPMENT CORPORATION
P. O. DRAWER 800
LAKELAND, FLORIDA 33801, U.S.A.

June 8, 1979

Mr. Lowell J. Udy, Director
Eastern States Office
Bureau of Land Management
7981 Eastern Avenue
Silver Spring, Maryland 20910

Dear Mr. Udy:

This company entered into agreement with BLM in 1965 with good intent in purpose, along with good faith for the purpose of discovering valuable phosphate deposits and thereby receive preferential phosphate mining leases, as provided by the written law.

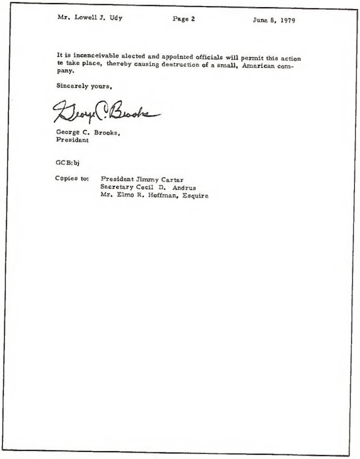
We performed under the law and in fact made discovery of valuable phosphate deposits, obviously apparent to any just and astute person.

I have reviewed the Draft Supplement to the Final Environmental Statement on Phosphate Leasing on the Osceola National Forest, Florida, dated April 5, 1979.

We must, therefore, advise of our vigorous objection to the inclusion of our lands under ES 3181, ES 3208, BLMA 080632, BLMA 080634 which are proposed to be included in the RARE II inventory designated as 08010 or withdrawal under any other act, including the Federal Endangered Species Act of 1973.

Further, this selection made apparently by whim and arbitrary means will withdraw enough acreage from the aforementioned lease blocks to, in effect, circumvent our rights under the law and destroy our small company.

The failure by the Department of the Interior to issue our leases over the past 10 years and three administrations has prevented the orderly growth of our company which was founded in 1965, with high hopes, under the spirit of American free enterprise.



Mr. Lowell J. Udy   Page 2   June 8, 1979

It is inconceivable elected and appointed officials will permit this action to take place, thereby causing destruction of a small, American company.

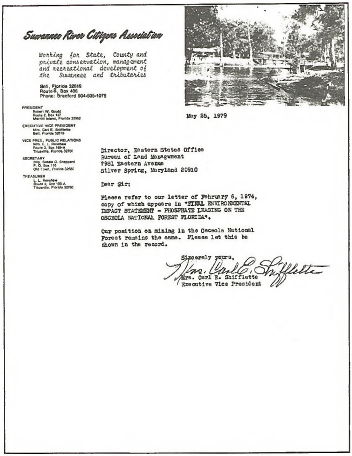
Sincerely yours,

George C. Brooks

George C. Brooks,
President

GCB:bj

Copies to: President Jimmy Carter
Secretary Cecil D. Andrus
Mr. Elmo R. Hoffman, Esquire



Suwannee River Citizens Association

Working for State, County and private conservation, management and recreational development of the Suwannee and tributaries

Bell, Florida 32619
Route 8, Box 486
Phone: Branford 904-935-1078

PRESIDENT
Robert W. Gould
Route 2, Box 127
Merritt Island, Florida 32952

EXECUTIVE VICE PRESIDENT
Mrs. Carl E. Shifflette
Bell, Florida 32619

VICE PRES., PUBLIC RELATIONS
Mrs. L. L. Renshaw
Route 2, Box 169-A
Titusville, Florida 32780

SECRETARY
Mrs. Bessie O. Sheppard
P. O. Box 116
Old Town, Florida 32680

TREASURER
L. L. Renshaw
Route 2, Box 169-A
Titusville, Florida 32780

May 25, 1979

Director, Eastern States Office
Bureau of Land Managwment
7981 Eastern Avenue
Silver Spring, Maryland 20910

Dear Sir:

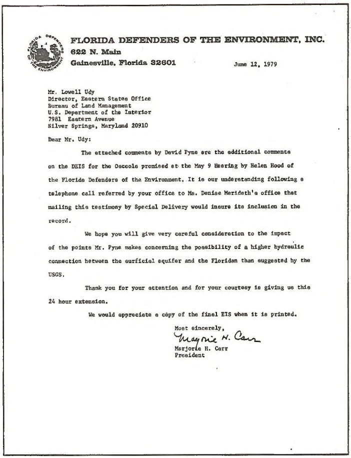
Please refer to our letter of February 6, 1974, copy of which appears in "FINAL ENVIRONMENTAL IMPACT STATEMENT - PHOSPHATE LEASING ON THE OSCEOLA NATIONAL FOREST FLORIDA".

Our position on mining in the Osceola National Forest remains the same. Please let this be shown in the record.

Sincerely yours,

Mrs. Carl E. Shifflette

Mrs. Carl E. Shifflette
Executive Vice President



FLORIDA DEFENDERS OF THE ENVIRONMENT, INC.
622 N. Main
Gainesville, Florida 32601

June 12, 1979

Mr. Lowell Udy
Director, Eastern States Office
Bureau of Land Management
U.S. Department of the Interior
7981 Eastern Avenue
Silver Springs, Maryland 20910

Dear Mr. Udy:

The attached comments by David Pyne are the additional comments on the DEIS for the Osceola promised at the May 9 Hearing by Helen Hood of the Florida Defenders of the Environment. It is our understanding following a telephone call referred by your office to Ms. Denise Merideth's office that mailing this testimony by Special Delivery would insure its inclusion in the record.

We hope you will give very careful consideration to the impact of the points Mr. Pyne makes concerning the possibility of a higher hydraulic connection between the surficial aquifer and the Floridan than suggested by the USGS.

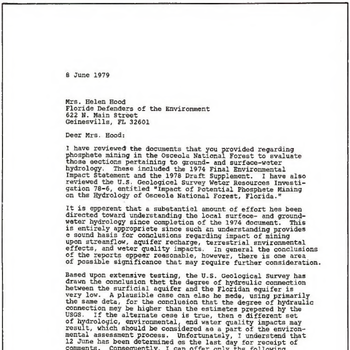
Thank you for your attention and for your courtesy is giving us this 24 hour extension.

We would appreciate a copy of the final EIS when it is printed.

Most sincerely,

Marjorie H. Carr

Marjorie H. Carr
President



8 June 1979

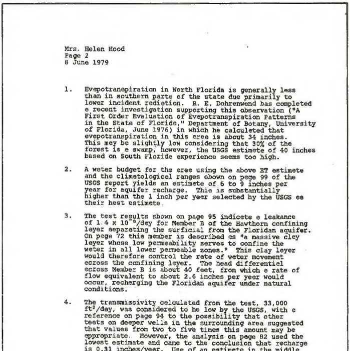
Mrs. Helen Hood
Florida Defenders of the Environment
622 N. Main Street
Gainesville, FL 32601

Dear Mrs. Hood:

I have reviewed the documents that you provided regarding phosphate mining in the Osceola National Forest to evaluate those sections pertaining to ground- and surface-water hydrology. These included the 1974 Final Environmental Impact Statement and the 1978 Draft Supplement. I have also reviewed the U.S. Geological Survey Water Resources Investigation 78-6, entitled "Impact of Potential Phosphate Mining on the Hydrology of Osceola National Forest, Florida."

It is apparent that a substantial amount of effort has been directed toward understanding the local surface- and groundwater hydrology since completion of the 1974 document. This is entirely appropriate since such an understanding provides a sound basis for conclusions regarding impact of mining upon streamflow, aquifer recharge, terrestrial environmental effects, and water quality impacts. In general the conclusions of the reports appear reasonable, however, there is one area of possible significance that may require further consideration.

Based upon extensive testing, the U.S. Geological Survey has drawn the conclusion that the degree of hydraulic connection between the surficial aquifer and the Floridan aquifer is very low. A plausible case can also be made, using primarily the same data, for the conclusion that the degree of hydraulic connection may be higher than the estimates prepared by the USGS. If the alternate case is true, then a different set of hydrologic, environmental, and water quality impacts may result, which should be considered as a part of the environmental assessment process. Unfortunately, I understand that 12 June has been determined as the last day for receipt of comments. Consequently, I can offer only the following general scenario for the alternate interpretation of the data, and the suggestion that someone should look into this more closely.



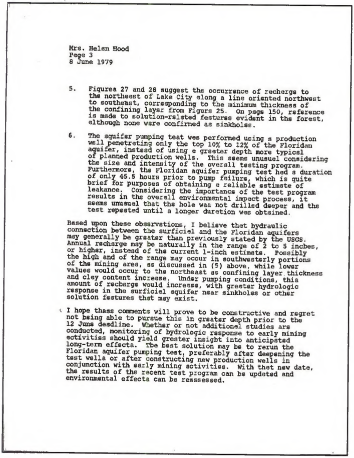
Mrs. Helen Hood
Page 2
8 June 1979

1. Evapotranspiration in North Florida is generally less than in southern parts of the state due primarily to lower incident radiation. R. E. Dohrenwend has completed a recent investigation supporting this observation ("A First Order Evaluation of Evapotranspiration Patterns in the State of Florida," Department of Botany, University of Florida, June 1976) in which he calculated that evapotranspiration in this area is about 34 inches. This may be slightly low considering that 30% of the forest is a swamp, however, the USGS estimate of 40 inches based on South Florida experience seems too high.

2. A water budget for the area using the above ET estimate and the climatological ranges shown on page 99 of the USGS report yields an estimate of 6 to 9 inches per year for aquifer recharge. This is substantially higher than the 1 inch per year selected by the USGS as their best estimate.

3. The test results shown on page 95 indicate a leakance of 1.4×10^{-8}/day for Member B of the Hawthorn confining layer separating the surficial from the Floridan aquifer. On page 72 this member is described as "a massive clay layer whose low permeability serves to confine the water in all lower permeable zones." This clay layer would therefore control the rate of water movement across the confining layer. The head differential across Member B is about 40 feet, from which a rate of flow equivalent to about 2.6 inches per year would occur, recharging the Floridan aquifer under natural conditions.

4. The transmissivity calculated from the test, 33,000 ft^2/day, was considered to be low by the USGS, with a reference on page 94 to the possibility that other tests on deeper wells in the surrounding area suggested that values from two to five times this amount may be appropriate. However, the analysis on page 82 used the lowest estimate and came to the conclusion that recharge is 0.31 inches/year. Use of an estimate in the middle of the range of transmissivity values, and use of a smaller area for analysis, limited to the more likely area of higher recharge above the 53 feet contour on Figure 28, would have led to a conclusion that recharge is at least 2 inches per year.



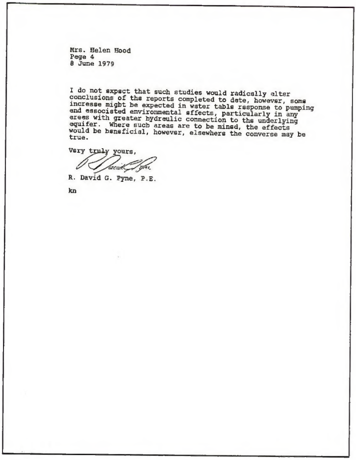
Mrs. Helen Hood
Page 3
8 June 1979

5. Figures 27 and 28 suggest the occurrence of recharge to the northeast of Lake City along a line oriented northwest to southeast, corresponding to the minimum thickness of the confining layer from Figure 25. On page 150, reference is made to solution-related features evident in the forest, although none were confirmed as sinkholes.

6. The aquifer pumping test was performed using a production well penetrating only the top 10% to 12% of the Floridan aquifer, instead of using a greater depth more typical of planned production wells. This seems unusual considering the size and intensity of the overall testing program. Furthermore, the Floridan aquifer pumping test had a duration of only 45.5 hours prior to pump failure, which is quite brief for purposes of obtaining a reliable estimate of leakance. Considering the importance of the test program results in the overall environmental impact process, it seems unusual that the hole was not drilled deeper and the test repeated until a longer duration was obtained.

Based upon these observations, I believe that hydraulic connection between the surficial and the Floridan aquifers may generally be greater than previously stated by the USGS. Annual recharge may be naturally in the range of 2 to 5 inches, or higher, instead of the current 1-inch estimate. Possibly the high end of the range may occur in southwesterly portions of the mining area, as discussed in (5) above, while lower values would occur to the northeast as confining layer thickness and clay content increase. Under pumping conditions, this amount of recharge would increase, with greater hydrologic response in the surficial aquifer near sinkholes or other solution features that may exist.

I hope these comments will prove to be constructive and regret not being able to pursue this in greater depth prior to the 12 June deadline. Whether or not additional studies are conducted, monitoring of hydrologic response to early mining activities should yield greater insight into anticipated long-term effects. The best solution may be to rerun the Floridan aquifer pumping test, preferably after deepening the test wells or after constructing new production wells in conjunction with early mining activities. With that new data, the results of the recent test program can be updated and environmental effects can be reassessed.



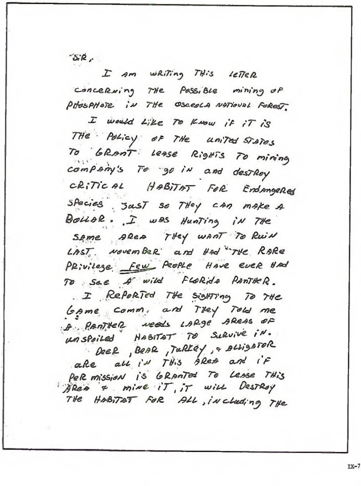
Mrs. Helen Hood
Page 4
8 June 1979

I do not expect that such studies would radically alter conclusions of the reports completed to date, however, some increase might be expected in water table response to pumping and associated environmental effects, particularly in any areas with greater hydraulic connection to the underlying aquifer. Where such areas are to be mined, the effects would be beneficial, however, elsewhere the converse may be true.

Very truly yours,

R. David G. Pyne, P.E.

kn



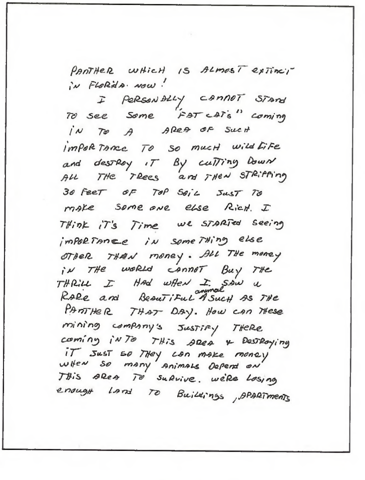
Sir,

I am writing this letter concerning the possible mining of phosphate in the Osceola National Forest.

I would like to know if it is the policy of the United States to grant lease rights to mining company's to go in and destroy critical habitat for endangered species just so they can make a Bollar. I was hunting in the same area they want to ruin last November and had the rare privilege few people have ever had to see a wild Florida panther.

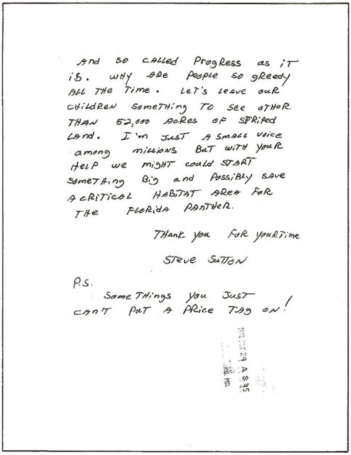
I reported the sighting to the Game Comm. and they told me a panther needs large areas of unspoiled habitat to survive in.

Deer, bear, turkey, & alligator are all in this area and if permission is granted to lease this area & mine it, it will destroy the habitat for all, including the



panther which is almost extinct in Florida now!

I personally cannot stand to see some "fat cat's" coming in to a area of such importance to so much wildlife and destroy it by cutting down all the trees and then stripping 30 feet of top soil just to make some one else rich. I think it's time we started seeing importance in something else other than money. All the money in the world cannot buy the thrill I had when I saw a rare and beautiful animal such as the panther that day. How can these mining company's justify there coming into this area & destroying it just so they can make money when so many animals depend on this area to survive. we're losing enough land to buildings, apartments



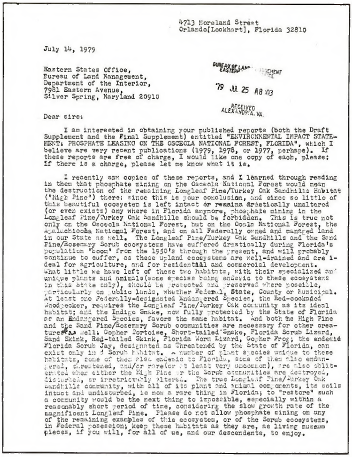
And so called Progress as it is. why are people so greedy all the Time. Let's leave our children something to see other than 52,000 acres of stripped Land. I'm just a small voice among millions But with your Help we might could start something Big and Possibly save a critical Habitat area for the Florida Panther.

Thank you for your Time

Steve Sutton

P.S.
Some Things you Just can't put a Price Tag on!

29 A 8:45
ING. MD.



4713 Moreland Street
Orlando[Lockhart], Florida 32810

July 14, 1979

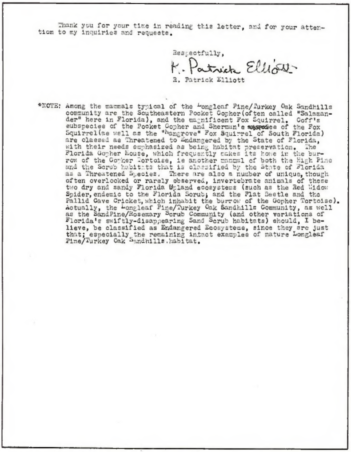
Eastern States Office,
Bureau of Land Management,
Department of the Interior,
7981 Eastern Avenue,
Silver Spring, Maryland 20910

BUREAU OF LAND MANAGEMENT
EASTERN STATES OFFICE
'79 JUL 25 A8:03
RECEIVED
ALEXANDRIA, VA.

Dear sirs:

I am interested in obtaining your published reports (both the Draft Supplement and the Final Supplement) entitled "ENVIRONMENTAL IMPACT STATEMENT: PHOSPHATE LEASING ON THE OSCEOLA NATIONAL FOREST, FLORIDA", which I believe are very recent publications (1979, 1978, or 1977, perhaps). If these reports are free of charge, I would like one copy of each, please; if there is a charge, please let me know what it is.

I recently saw copies of these reports, and I learned through reading in them that phosphate mining on the Osceola National Forest would mean the destruction of the remaining Longleaf Pine/Turkey Oak Sandhills Habitat ("High Pine") there: since this is your conclusion, and since so little of this beautiful ecosystem is left intact or remains drastically unaltered (or even exists) any where in Florida anymore, phosphate mining in the Longleaf Pine/Turkey Oak Sandhills should be forbidden. This is true not only on the Osceola National Forest, but on the Ocala National Forest, the Apalachicola National Forest, and on all Federally owned and managed land in our State as well. The Longleaf Pine/Turkey Oak Sandhills and the Sand Pine/Rosemary Scrub ecosystems have suffered drastically during Florida's population "boom" from the 1950's through the present, and will probably continue to suffer, as these upland ecosystems are well-drained and are ideal for agriculture, and for residential and commercial development. What little we have left of these two habitats, with their specialized and unique plants and animals(some species being endemic to these ecosystems in this State only), should be protected and preserved where possible, particularly on public lands, whether Federal, State, County or Municipal. At least one Federally-designated Endangered Species, the Red-cockaded Woodpecker, requires the Longleaf Pine/Turkey Oak community as its ideal habitat; and the Indigo Snake, now fully protected by the State of Florida as an Endangered Species, favors the same habitat. And both the High Pine and the Sand Pine/Rosemary Scrub communities are necessary for other creatures* as well: Gopher Tortoise, Short-tailed Snake, Florida Scrub Lizard, Sand Skink, Red-tailed Skink, Florida Worm Lizard, Gopher Frog; the endemic Florida Scrub Jay, designated as Threatened by the State of Florida, can exist only in a Scrub habitat. A number of plant species unique to these habitats, some of them also endemic to Florida, some of them also endangered, threatened, and/or rare(or at least very uncommon), are also obliterated when either the High Pine or the Scrub communities are destroyed, disturbed, or irretrievably altered. The true Longleaf Pine/Turkey Oak Sandhills community, with all of its plant and animal components, its soils intact and undisturbed, is now a rare thing in Florida; to "restore" such a community would be the next thing to impossible, especially within a reasonably short period of time, considering the slow growth rate of the magnificent Longleaf Pine. Please do not allow phosphate mining on any of the remaining examples of this ecosystem, or of the Scrub ecosystems, in Federal possession; keep these habitats as they are, as living museum pieces, if you will, for all of us, and our descendents, to enjoy.



Thank you for your time in reading this letter, and for your attention to my inquiries and requests.

Respectfully,

R. Patrick Elliott

R. Patrick Elliott

*NOTE: Among the mammals typical of the Longleaf Pine/Turkey Oak Sandhills community are the Southeastern Pocket Gopher(often called "Salamander" here in Florida), and the magnificent Fox Squirrel. Goff's subspecies of the Pocket Gopher and Sherman's subspecies of the Fox Squirrel(as well as the "Mangrove" Fox Squirrel of South Florida) are classed as Threatened to Endangered by the State of Florida, with their needs emphasized as being habitat preservation. The Florida Gopher Mouse, which frequently makes its home in the burrow of the Gopher Tortoise, is another mammal of both the High Pine and the Scrub habitats that is classified by the State of Florida as a Threatened Species. There are also a number of unique, though often overlooked or rarely observed, invertebrate animals of these two dry and sandy Florida Upland ecosystems (such as the Red Widow Spider, endemic to the Florida Scrub; and the Flat Beetle and the Pallid Cave Cricket, which inhabit the burrow of the Gopher Tortoise). Actually, the Longleaf Pine/Turkey Oak Sandhills Community, as well as the SandPine/Rosemary Scrub Community (and other variations of Florida's swiftly-disappearing Sand Scrub habitats) should, I believe, be classified as Endangered Ecosystems, since they are just that; especially the remaining intact examples of mature Longleaf Pine/Turkey Oak Sandhills habitat.

X. GLOSSARY

Critical Habitat	A precisely defined area, designated by the Director of the Fish and Wildlife Service or National Marine Fisheries Service, that undergoes the Federal rulemaking process of proposal, review, and finalization through the Federal Register. As defined in the Endangered Species Act Interagency Cooperation Regulations 50 CFR Section 402, it "means any air, land, or water area (exclusive of those existing man-made structures or settlements which are not necessary to the survival and recovery of a listed species) and constituent elements thereof, the loss of which would appreciably decrease the likelihood of the survival and recovery of a listed species or a distinct segment of its population. The constituent elements of critical habitat include, but are not limited to: physical structures and topography, biota, climate, human activity, and the quality and chemical content of land, water, and air.

Critical habitat may represent any portion of the present habitat of a listed species and may include additional areas for reasonable population expansion."

Endangered Species (Replaces previous definition, pg. X-3)

Federal Classification	Those species determined by the Secretary of the Interior or the Secretary of Commerce to be likely to become extinct in the near future throughout all or a significant portion of their range. A list of these species is published and amended periodically in the Federal Register.
State Classification	A species, jointly determined by the Director of the Florida Game and Fresh Water Fish Commission and the Executive Director of the Florida Department of Natural Resources, which is in danger of extinction throughout all or a significant portion of its range in the State due to (1) destruction, drastic

	modification or severe curtailment of habitat, or (2) its overutilization for commercial or sporting purposes, or (3) effect of disease or pollution, or (4) other natural or man-made factors.
Essential Habitat	Habitat that is considered necessary for the well-being of a species, but does not have a legal status.
No change	When used in parentheses after outline headings, this means the applicable section in Int. FES 74-37 was not altered in the Supplement process. It does not necessarily mean that all the information in the applicable section is current.
Potential phosphate deposits	Refers to 28,000 acres of phosphate deposits (identified in Map No. 2, Chapter XI of Int. FES 74-37) which

	are located on 23,500 acres within the lease application areas, and 4,500 acres adjacent thereto.
Reclamation	The process by which the land is returned to some useful condition; unless an urban, industrial or other land use is specified, reclamation implies that the land will be graded and revegetated.
Restoration	The process by which the land is returned to its previous condition.
Threatened Species (Replaces previous definition, pg. X-8)	
Federal Classification	Those species determined by the Secretary of the Interior or the Secretary of Commerce to be likely to become endangered in the near future throughout all or a significant portion of their range. A list of these species is published and amended periodically in the Federal Register.

State Classification	A species, jointly determined by the Director of the Florida Game and Fresh Water Fish Commission and the Executive Director of the Florida Department of Natural Resources, which may become an endangered species within the foreseeable future in all or a significant portion of its range in the state due to (1) destruction, drastic modification or severe curtailment or habitat, or (2) its overutilization for commercial or sporting purposes, or (3) effect of disease or pollution, or (4) other natural or man-made factors.
Transmissivity	The rate at which water of the prevailing kinematic viscosity is transmitted through a unit width of the aquifer under a unit hydraulic gradient; expressed as ft^2/day.

XI. MAPS

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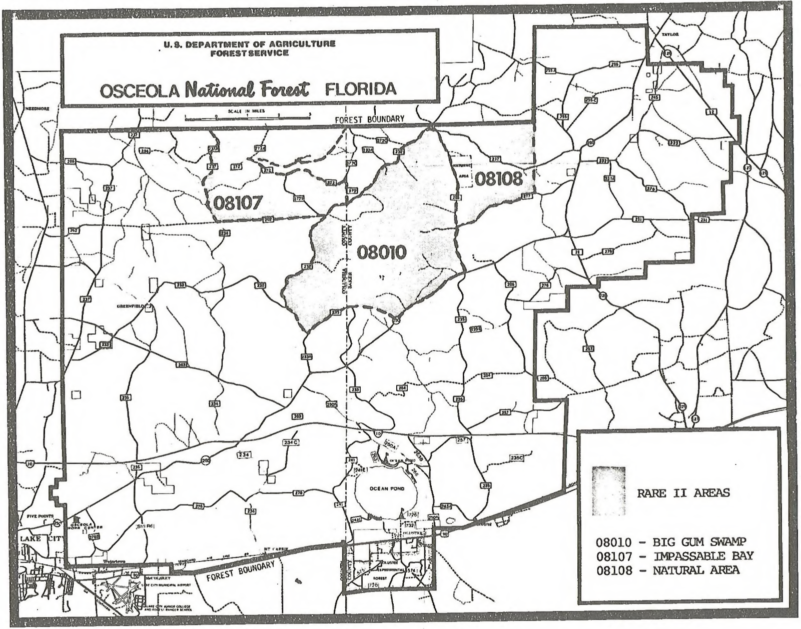
1. Roadless Area Review and Evaluation (RARE) II Inventory--Osceola National Forest----------------------------XI-2



Map 1. Roadless Area Review and Evaluation (RARE) II Inventory –
Osceola National Forest

XII. APPENDICES

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APPENDIX 1

ADDRESS ONLY THE DIRECTOR,
FISH AND WILDLIFE SERVICE

United States Department of the Interior

FISH AND WILDLIFE SERVICE
WASHINGTON, D.C. 20240

In Reply Refer To:
FWS/OES 375

JUN 28 1978

Mr. Lowell J. Udy
Director, Eastern States Office
Bureau of Land Management
Silver Spring, Maryland 20240

Dear Mr. Udy:

This responds to your March 30, 1978, request for consultation under Section 7 of the Endangered Species Act of 1973 on the proposal to issue preference right leases for surface extraction of phosphate on 52,000 acres in the Osceola National Forest in Florida and its impact on the Endangered and Threatened species identified in your memorandum. In addition to those species identified in your memorandum, our response of April 20, 1978, indicated that the Eastern indigo snake (a recently listed Threatened species) was also in the area and that we would consider it in our consultation. Therefore, the following listed species were included in our consultation: Florida panther (*Felis concolor coryi*); gray bat (*Myotis grisescens*); Florida manatee (*Trichechus manatus*); bald eagle (*Haliaeetus leucocephalus*); Arctic peregrine falcon (*Falco peregrinus tundrius*); ivory-billed woodpecker (*Campephilus principalis*); red-cockaded woodpecker (*Picoides* (=*Dendrocopos*) *borealis*); Bachman's warbler (*Vermivora bachmanii*); American alligator (*Alligator mississippiensis*); and Eastern indigo snake (*Drymarchon corais couperi*).

In response to your request, I appointed a consultation team by memorandum of April 20, 1978 (copy enclosed), to assist me in determining whether the proposed preference right leasing and the subsequent mining and development would likely jeopardize the continued existence of the above listed species or result in the destruction or modification of their Critical Habitats. The team was comprised of Mr. David Wesley, Wildlife Biologist, Office of Endangered Species, (Washington, D.C.); Mr. Robert Cooke, Endangered Species Specialist (Regional Office, Atlanta, Georgia); Dr. William Lindsay, Regional Activity Leader-Coal/Minerals (Regional Office, Atlanta, Georgia), and Mr. David Peterson, Endangered Species Coordinator (Area Office, Jacksonville, Florida).

AMERICAN REVOLUTION BICENTENNIAL 1776-1976

Rec'd ESO (910)
7/3/78
910/J. Reed

On May 2, 1978, the consultation team met your representative in Gainesville, Florida to discuss the proposed lease action and its effects on Endangered and Threatened species. A field trip was taken to the Osceola National Forest and the District Ranger conducted a tour of a portion of the proposed lease areas. On the same day the group also visited an existing phosphate mining operation (Occidental Chemical Company) in the vicinity of the Osceola National Forest to observe ongoing mining and reclamation techniques and procedures.

On May 3, 1978, the consultation team met with Dr. Steve Christman, Project Director for the study leading to the supplemental report "Osceola National Forest Phosphate Extraction and Processing: Impacts on Endangered Species", to discuss the information in the report. The team also met with representatives from the Forest Service's office in Tallahassee to obtain their views on the proposed leasing and their comments on the supplemental Endangered species report. The consultation team reviewed numerous reports, publications, and correspondence from knowledgeable sources on the subject species and, in addition, numerous telephone contacts were made with other experts. Information contained in the Final Environmental Impact Statement for the Phosphate Leasing on the Osceola National Forest, Florida, the supplemental Endangered Species Report, identified above, and the U.S. Geological Survey report on the "Impact of Potential Phosphate Mining on the Hydrology of Osceola National Forest, Florida" were all carefully evaluated to ascertain the effects of the proposed leases, and subsequent mining and development on the above listed species. Copies of pertinent reports and documents are included in an administrative record maintained at the Office of Endangered Species and are incorporated herein by reference.

After careful review of the findings by the consultation team, it is my biological opinion, subject to the conditions identified herein, that the proposed project is not likely to jeopardize the continued existence of the Endangered or Threatened species listed above or result in the destruction or adverse modification of their Critical Habitats. This biological opinion is based on only the preferential lease tracts now proposed for issuance and does not relieve BLM of the continuing responsibility of reviewing its activities and programs in light of their Section 7 obligations, including issuance of new preference right leases. BLM must reinitiate Section 7 Consultation should new information reveal impacts on the above listed species or their habitats which was not considered in this consultation, the proposed leasing is subsequently modified or a new species is listed that may be affected by the proposed action.

A summary of the biological data and considerations used in evaluating the effects of the proposed action on the listed species and conditions of this opinion are listed below.

This biological opinion is divided into two parts. Part one discusses those species which are not likely to be jeopardized by the proposed action as planned. Part II discusses those species which are not likely to be jeopardized by the proposed action providing certain restrictions on mining are imposed.

PART I:

Bald Eagle (Haliaeetus leucocephalus)

The bald eagle was initially considered to have two distinct subspecies when the southern bald eagle was listed originally as an Endangered species in the Federal Register on March 11, 1967. The entire species was listed as Endangered in 43 of the conterminous 48 States and Threatened in the remaining five States on February 14, 1978. Critical Habitat has not been determined for the bald eagle.

There are approximately 250 known bald eagle nest territories in Florida. The majority of these territories are located along the West Coast from Cedar Key south, in the Everglades, and the central section of the peninsula, generally south of Levy, Alachua, Putnam and St. Johns Counties. Isolated, scattered, nest territories are also known to exist in northern Florida and the "panhandle" of the State but there are no known nests within the Osceola National Forest. The birds, with few exceptions, primarily utilize these territories only during the nesting season and usually migrate out of the State following the fledging of the young in March or April.

Nest territories are located in close proximity to large bodies of water and availability of a food supply is not considered to be a limiting factor for the species. Availability of suitable nesting habitat and mortality from shooting appear to be primary causes of the eagle's decline in the State.

There are no known bald eagle nests in the Osceola National Forest, or adjacent areas and only a few bald eagles have been sighted in the area. Therefore, the activities projected to result from issuance of preference right leases for surface extraction of phosphate are not likely to jeopardize the continued existence of the bald eagle.

Arctic Peregrine Falcon (Falco peregrinus tundrius)

The Arctic peregrine falcon was listed as an Endangered species in the Federal Register on October 13, 1970. Critical Habitat has not been determined for the peregrine. The Arctic peregrine falcon breeds north of the tree line in North America. It winters along the Gulf Coast from Florida to the eastern Mexican Coast, Baja California, and south to mid-Chile and mid-Argentina. The migration pattern of the peregrine funnels into the Florida coastal area and winter concentrations are found along the beaches and barrier islands. The peregrine requires an area containing an abundance of prey species in an open habitat. Florida's coastal marshes provide such habitat where wintering peregrines feed on ducks, coots, gulls, and other water associated birds.

Since no suitable peregrine habitat exists and there are no known records of Arctic peregrine falcons occurring in the Osceola National Forest, the activities projected as a result of this proposed action are not likely to jeopardize the continued existence of this species.

Gray Bat (Myotis grisescens)

The gray bat was listed as an Endangered species in the Federal Register on April 28, 1976. Gray bats are primarily cave dwellers, selecting caves with narrow temperature ranges between 6° and 9° C in the winter and summer temperatures greater than 13°C. There are exceptions, however, as colonies have been found in a barn, an old meat packing plant, and a storm sewer. The gray bat's range in the State of Florida has been presumed to be limited to the limestone cave areas of the "panhandle", although one specimen in the Florida State Museum was collected in Lake City, Columbia County.

Two bats were collected within the Osceola National Forest during the Endangered species study. One juvenile, which was too young to have migrated from the presently known nursery roosts in western Florida, was collected in the vicinity of the middle prong of the Little St. Mary's River, outside the preferential lease tract area. However, intensive surveys of the Osceola National Forest were unable to locate any caves or nursery roosts.

Since the gray bats were only observed in the eastern portion of the Osceola National Forest and no known caves or nursery roosts were found in the forest, the impacts from the proposed activity are not likely to jeopardize the continued existence of this species.

Florida Manatee (Trichechus manatus)

The Florida manatee was listed originally as Endangered on March 11, 1967. The manatee is an aquatic mammal that inhabits both fresh and salt water areas and concentrates in warm waters generally between the months of

October and April. Manatees are known to frequent the lower reaches of the Suwannee River during summer months, and several of the springs that feed the river are used as winter refuges. Critical Habitat has been determined for the manatee, but none of the Osceola National Forest is within this Critical Habitat.

The species is almost exclusively herbivorous feeding on a variety of submergent, emergent, and floating vegetation. Any change in water quality, therefore, has the potential to alter the quantity, quality, and distribution of the aquatic vegetation that forms the manatee's diet. Such a change could have a detrimental effect on the manatee. However, since the manatee has never been observed above Branford in the Suwannee River, activities expected to result from the proposed issuance of preference right leases and subsequent exploration and surface extraction of phosphate are not likely to jeopardize the continued existence of the manatee or result in destruction or adverse modification of its Critical Habitat.

American Alligator (Alligator mississippiensis)

The American alligator was listed originally as Endangered on March 11, 1967. It was reclassified as Threatened in the wild in Florida and in certain areas of Georgia, Louisiana (except in Cameron, Vermilion and Calcasieu Parishes), South Carolina and Texas in the Federal Register on January 10, 1977. Critical Habitat has not yet been determined for this species. The primary cause of the reduction in alligator numbers has been attributed to overharvesting. The relatively low numbers of alligators in the Osceola National Forest may be the result of illegal hunting.

While lakes created as a result of strip mining activities may appear to be of potential benefit to the species, such areas may increase the exposure of alligators to illegal hunting. If this is the primary cause of their present low numbers, the net benefit could be negative. The severity of these impacts, however, is not likely to jeopardize the continued existence of the species in view of its current population levels and reproductive potential throughout its range.

PART II:

It is my biological opinion that the anticipated impacts from the proposed preference right leasing program as planned are not likely to jeopardize the continued existence of the following described species provided the currently proposed preference right lease program is modified in accordance with the recommendations which appear after the following species' descriptions.

Florida Panther (Felis concolor coryi)

The Florida panther was listed as an Endangered species in the Federal Register on March 11, 1967. Critical Habitat for the panther has not yet been determined. The Florida panther is a wide ranging, secretive animal that historically inhabited most of the southeastern United States, and has been reported in every major habitat type in Florida. Although it does not seem to require a specific habitat for survival it does need a large area with an ample food supply, principally deer, and dense vegetation for cover.

The entire Osceola National Forest is potential panther habitat, but Impassable Bay and Big Gum Swamp appear to be the most suitable areas because they offer greater protection from human disturbance and form a connecting corridor with additional remote areas to the north, including the Okefenokee National Wildlife Refuge.

Neither the Florida Panther Recovery Team, the group conducting the Endangered Species study, nor Okefenokee Refuge personnel have confirmed reports of panthers being present in the area. There have been, however, two confirmed reports of panthers in the forest, one in 1974 and one in 1976 plus panther sightings on the nearby Occidental Chemical Company lands. The scarcity and secretive nature of the Florida panther, along with the inaccessibility of some areas of the Forest, may explain the lack of confirmed sightings by the Endangered Species study personnel. In either case, whether the panther is actually present or not, the more remote sections of the forest do provide potential habitat in the form of large, heavily vegetated, and relatively disturbance free areas.

Bachman's Warbler (Vermivora bachmanii)

The Bachman's warbler was listed as an Endangered species in the Federal Register on March 11, 1967. Critical Habitat has not yet been determined for this species. The Bachman's warbler breeds in southern hardwood swamps north of Florida. It winters in Cuba and migrates through Florida northward in late February to early April and southward from July to early September.

Reasons for the decline of this species are obscure, but it is thought that cutting of vast areas of swamp and bottomland timber in the southeast is the primary factor. Excessive collection along the restricted migration route in Florida may have caused a serious decline in earlier years. An unconfirmed report of a Bachman's warbler was made in Lake City, 2 Km from the southwestern corner of the Osceola National Forest in the spring of 1976. However, no confirmed sightings have been made in the Forest.

Ivory-billed Woodpecker (Campephilus principalis)

The Ivory-billed woodpecker was listed as an Endangered species in the Federal Register on March 11, 1967. Critical Habitat has not been determined for this species. The ivory-billed woodpecker, last recorded in Florida in 1969 in the vicinity of Highlands Hammock State Park in Highlands County, was formerly found throughout the State in river swamps with extensive mature stands of lowland hardwoods away from disturbance by man.

There is no evidence to indicate that the bird is presently within the Osceola National Forest, although museum specimens dating back to 1914 prove that the bird did occur in Baker County adjacent to the National Forest. The precise location is unknown.

Should the above three species be present, the most likely areas of suitable habitat would be Big Gum Swamp, Little Gum Swamp and Impassable Bay. Big Gum Swamp and Impassable Bay both tie into the Okefenokee Swamp system in southern Georgia and provide extremely dense swamp habitat suitable for the three species described above.

The activities expected to result from the issuance of preference right leasing and subsequent development are not likely to jeopardize the continued existence of the Florida panther, Bachman's Warbler and ivory-billed woodpecker. However, site specific information is not available to indicate where roads, processing (known as beneficiation) plants and support facilities will occur and since the swamp areas delineated by the following boundaries may provide habitat for these species, any activity or program authorized funded or carried out in these areas by a Federal agency, particularly those related to the proposed leases, and subsequent development actions which may affect the Florida panther, Bachman's Warbler or ivory-billed woodpecker, will require Section 7 consultation. The designated areas can be delineated by using the following road system.

Beginning on the North boundary of Osceola National Forest at the northwest corner of T.1S-R18E Section 19 proceed south to junction with NF Road 234. Proceed then southeasterly along NF Road 234 to its junction with NF Road 262. Then proceed easterly along NF Road 262 to its junction with NF Road 232. Then southerly along NF Road 232 to its junction with NF Road 233. Then proceed southerly along NF Road 233 to its junction with State Highway 250. Then northeasterly along State Highway 250 until it exits the Osceola National Forest. Then north along Osceola National Forest boundary to northern boundary of T.1S-R20E Section 3. Then westward to the northwest corner of T.1S-R.20E Section 6. Then south on the Osceola National Forest boundary line to northwest corner of T.1S-R.20E Section 19. Then westwardly to northwest corner of T.1S-R.18E Section 19. This area is delineated as area one on the enclosed map.

Red-cockaded Woodpecker (Dendrocopos borealis)

The red-cockaded woodpecker was listed as an Endangered species in the Federal Register on October 13, 1970. The red-cockaded woodpecker is a cavity nesting bird with a specific habitat requirement for open, park like, stands of mature or overmature (60 to 80 year old) southern pines for their nests. The species' present status of endangerment is the result of forest rotations that preclude these conditions on most private lands, and as a result, most red-cockaded woodpecker colonies are now found primarily on State and Federal lands, with an estimated 75 percent of all red-cockaded woodpeckers living in National Forests.

Forty active colonies were found on the Osceola National Forest, and it is estimated that the forest may contain an additional 10 to 20 undiscovered colonies, for a total of at least 120 birds, or 12 to 18 percent of the estimated total Florida population of 1,000 to 1,500 birds. The National population is estimated at 3,000 to 10,000 birds.

Eleven of the 40 known colonies are located within the mining lease areas, with an additional 10 known colonies located within .8 Km of the proposed mining sites, thus up to 53 percent of the Osceola National Forest's total population could be lost as a result of mining activities.

The Osceola population, second largest in the State (the largest being on the Appalachicola National Forest, which has considerably greater acreage), occurs at the northern end of peninsular Florida, and may serve an important role in supplying colonizers as new habitat becomes available elsewhere in the State.

Therefore, I consider the loss of this many colonies from the Osceola National Forest is likely to jeopardize the continued existence of an integral segment of the Florida red-cockaded woodpecker population if all of the proposed lease sites are mined as planned. However, if the following recommendations are incorporated, the activities expected to result from the proposed mining as modified are not likely to jeopardize the continued existence of the red-cockaded woodpecker.

1. Eliminate the following described areas from the proposed and future mining activities:

   Beginning on the south boundary of the Osceola National Forest at NF 236 in Section 2S (T.3S-R.17E). Then proceed northerly along NF 236 to junction of NF 278. Then east on NF 278 to junction of 241. Then south along NF 241 to the southern forest boundary. Then west along southern boundary line of Osceola National Forest to NF 278. This area is delineated as area 2 on the enclosed map. This area contains only one section and parts of two other sections that are included in the proposed leasing activities.

2. Whenever a nesting colony occurs within the area not excluded from mining, it must be suitably protected as defined in the Red-cockaded Woodpecker Recovery Plan. (Pertinent section enclosed, Attachment 2)

Eastern Indigo Snake (Drymarchon corais couperi)

The Eastern indigo snake was listed as a Threatened species in the Federal Register on January 31, 1978. The Eastern indigo snake occurs in a wide variety of habitat types throughout the Florida peninsula including the Osceola National Forest with an erratic distribution in the Florida Panhandle, southern Georgia and southeastern South Carolina. Although historically found in Alabama and Mississippi it may be extirpated from these States.

In higher, and drier, sites the snake is usually associated with the burrows of the gopher tortoise, possibly because the tortoise burrows apparently provide cool, moist, habitat for the snake, which in laboratory experiments, has been shown to be susceptible to desiccation.

Since the species appears to be adaptable to a wide range of habitat types, the reason for its present status as Threatened appears to be the result of overcollection for the pet trade, rather than habitat loss.

Much of the Osceola National Forest has a high ground water table, reducing the indigo's dependence on the gopher tortoise. While mining activities might increase the amount of frogs, snakes, lizards and small mammals that comprise the diet of the snakes, the increased exposure to human activity with its resultant potential for illegal collection would probably offset beneficial impacts from a more abundant food supply. The eastern indigo was sighted in two locations in the Osceola National Forest, one of which was in the proposed mining area.

It is my biological opinion that the anticipated effects of the proposed leasing is not likely to jeopardize the continued existence of the indigo snake providing the preceeding recommendations for the red-cockaded woodpecker are followed.

However, site specific information is not available to indicate where roads, beneficiation plants and support facilities will occur and since the Eastern indigo has been seen in the vicinity of Deep Creek Recreation Area, any activity or program authorized, funded, or carried out in the vicinity of Section 34 and 35 in Township 1 South, Range 17 East and Sections 2 and 3 of Township 2 South, Range 17 East by a Federal agency, particularly those related to the proposed leases and subsequent development actions which may affect the Eastern indigo snake, will require Section 7 consultation.

Conclusions

Based on my consultation team's review of the above information and other information and data available to the Service, it is my biological opinion that, subject to the previously identified conditions, the issuance of preference right leases for surface extraction of phosphate on 52,000 acres in the Osceola National Forest is not likely to jeopardize the continued existence of the previously identified Threatened or Endangered species or result in the destruction or adverse modification of their identified Critical Habitats.

We sincerely appreciate BLM's cooperation in this matter. Please advise if we can be of further assistance.

Sincerely,

Lynn A. Greenwalt

Director

Appendix A

Recommended Management for the Red-cockaded Woodpecker

The amount of land recommended as a management unit around and including a Red-cockaded Woodpecker colony was arrived at on the basis of current knowledge of the home range used by a clan throughout the year. Studies in Mississippi, Georgia, Florida, Texas, and South Carolina indicate that the home range of a Red-cockaded Woodpecker clan can approach or exceed 200 acres (Jackson, pers. obs. - Mississippi and Georgia; W. Baker, 1971a and S. Nesbitt, pers. comm. - Florida; Skorupa and McFarlane 1976, and R. Hooper, R. Harlow, and M. Lennartz, pers. comm. - South Carolina). Preparation of these recommendations was facilitated by our use of the Wildlife Management Handbook of the U.S. Forest Service (USDA 1971) as a base from which to begin.

These recommendations are intended for public lands. We recommend they they be followed on private and industry lands where possible, but we emphasize that even minimal efforts to assist the birds should be encouraged. Smaller management units may be necessary for economic or land ownership reasons. In such cases we feel that the minimal efforts should be (1) retention of cavity trees and potential replacement cavity trees, (2) limited control of hardwoods at colony sites, and (3) maintenance of a corridor of pines - however narrow - linking the cavity trees with suitable foraging habitat.

Specific recommendations follow:

1. Throughout the Red-cockaded Woodpecker's range all colonies should be managed with the survival of this species as the primary management goal.

2. Map and mark all cavity trees in a standard manner; include at least a 200 foot buffer around each. Any logging within the colony and buffer zone should be done by individual stems or groups to perpetuate

roosting, nesting, and replacement trees; to open up the stand; to alter stand composition in order to produce replacement cavity trees; and to control southern pine beetle and disease outbreaks. The period for this logging should be August through February.

3. Maintain at least 200 acres of contiguous pine or pine-hardwood forest, including the colony site, for feeding and for replacement cavity trees. If 200 acres are not present, manage the available acreage according to these recommendations.

4. No rotations should be set for colony sites. Rotations for the remainder of the 200 acres vary according to pine species. We recommend a minimum of 100-year rotations for longleaf and 80-year rotations for loblolly and other pines. Work toward a balance of age classes to retain or develop at least 50% of the area in the older age classes (50 years or older on a 100 year rotation and 40 years or older on an 80 year rotation).

5. Dense understory approaching cavity height may cause the birds to abandon the colony. Burn or thin to control this condition.

6. In colonies, confine site preparation to prescribed burning or herbicide injection of unwanted stems. Use either natural regeneration or planting (whichever is suitable to the site) to perpetuate the pines.

7. Maintain the cavity trees and a basal area of 50 to 80 square feet per acre in colonies. Retain mature pines as replacement cavity trees within the colony.

8. The competition for the cavities made by Red-cockaded Woodpeckers is very high from other animals. Other species of woodpeckers often enlarge the openings in trees so that, for example, they later serve as dens for gray and fox squirrels, Wood Ducks, Screech Owls, and other wildlife. In order to prevent excessive competition for the Red-cockaded cavities, we recommend that, if possible, colonies be tied in with drier stands rather

than wetter sites (this may reduce Pileated Woodpecker enlargement of cavities), and that decadent cavity trees and dead snags should be left as alternative nest sites for other cavity nesting species. Addition of nest boxes for other species may also reduce the competition for the Red-cockaded Woodpecker cavities. See the discussion of competition and associated problems in Jackson (in press).

9. Open park-like stands are preferred by the Red-cockaded Woodpecker and can be maintained by periodic thinning and prescribed burning. Take precautions to prevent fire from igniting cavity trees. Do not perform silvicultural treatments within the colony site during the nesting season (March through July).

10. Do not construct roads in colony sites unless other location options are not available.

11. In colonies seriously infested with southern pine beetles, the affected stems (except cavity trees) may be cut and removed, cut and burned, or cut and sprayed with a non-persistent pesticide. A cavity tree infested with other bark beetles may be sprayed below the level of the cavity. Pesticides toxic to vertebrates - such as organophosphates - should not be used.

Limit the application of pesticides for fire ant control to the treatment of individual mounds when within ½ mile of a colony.

12. Casual human activity in a colony area, such as nature trails, generally does not disturb Red-cockaded Woodpeckers. Establishment of educational demonstration colonies should be encouraged. The colonies selected for this use should be those that are already adjacent to roads, trails, or other areas of human activities.

APPENDIX 2

Title 43—Public Lands: Interior

CHAPTER II—BUREAU OF LAND MANAGEMENT

[Circular No. 2390]

PART 3520—PREFERENCE RIGHT AND COMPETITIVE LEASES

Prospecting Permits; Issuance of Leases

1. 43 CFR Subpart 3520 is amended by revising § 3520.1-1 to read as follows:

§ 3520.1-1 Preference right leases.

(a) *Coal, phosphate, sodium, sulphur, and potassium* (1) The authorized officer shall issue a lease to the holder of a prospecting permit issued for phosphate, sodium, sulphur, or potassium if the permittee shows to the authorized officer that, within the term of the permit, he discovered a valuable deposit of the mineral for which the permit was issued, or for a prospecting permit issued for coal, if the permittee shows to the Secretary that he discovered commercial quantities of coal. (2) If the permit is for sodium, sulphur, or potassium, the authorized officer may not issue a lease unless the permittee also shows that the land is chiefly valuable for the development of the mineral deposit discovered.

(b) *Lease area.* The lease shall be for all or part of the lands in a reasonably compact form.

(c) *Standards to determine "valuable deposit" and "commercial quantities."* A permittee has discovered commercial quantities of coal or a valuable deposit of one of the other permit minerals if the mineral deposit discovered under the permit is of such a character and quantity that a prudent person would be justified in the further expenditure of his labor and means with a reasonable prospect of success in developing a valuable mine. The permittee must present sufficient evidence to show that there is a reasonable expectation that his revenues from the sale of the mineral will exceed his costs of developing the mine, and extracting, removing, and marketing the mineral.

(d) *Applicability.* The standard in paragraph (c) of this section shall apply to all future applications for leases by prospecting permittees, and to applications pending on the effective date of this regulation. Leases which have been issued prior to that date may not be reexamined to determine whether they meet the standards in paragraph (c) of this section.

2. 43 CFR Subpart 3521 is amended by revising § 3521.1-1 and adding §§ 3521.1-4, and 3521.1-5 to read as follows:

§ 3521.1-1 Forms.

(a) (1) An application for a lease by a prospecting permittee shall be filed within 30 days after the permit expires.

(2) If a permittee needs additional time to submit the information required by section 3521.1-1(b) of this part and files, within 30 days after the permit expires or within 60 days from the effective date of these regulations, whichever is later, a notice of application and request for extension of time, the authorized officer shall extend the time for submitting the required information for the period requested, but for not more than one year.

(b) *Initial showing.* The initial application for a lease shall contain the following information:

(1) The quantity and quality of the minerals discovered within the area included within the permit. The term "quantity of minerals" means only measured and indicated reserves. Structural maps of the tops of all beds to be mined; isopachous maps of beds to be mined and interburden; and isopachous maps of overburden (for beds to be mined by surface methods). These maps shall show the location of test holes and outcrops. Estimates of measured and indicated reserves for each bed to be mined must also be submitted. Coal quality data submittals shall include, as a minimum, an average proximate analysis and BTU content for coal beds, or average grade of the ore for other minerals. In addition, all supporting geological and geophysical data used in development of the above required information shall be submitted.

(2) A map, or maps, as may be available from State or Federal sources, which shows the topography of the land applied for, on which the applicant shall show physical features and natural drainage patterns and existing roads, vehicular trails, and utility systems; the location of any proposed development or mining operations and facilities incidental thereto, including the appropriate locations and areal extent of the areas to be used for pits, overburden, and tailings; and the location of water sources or other resources which may be used in the proposed operations or facilities incidental thereto.

(3) A narrative statement, including:

(i) The anticipated scope, method, and schedule of development operations, including the types of equipment to be used;

(ii) The method of mining anticipated, including the best available estimate of the mining sequence and production rate to be followed;

(iii) The relationship, if any, between the mining operations anticipated on the lands applied for and existing or planned mining operations, or facilities incidental thereto, on adjacent Federal or non-Federal lands;

(iv) A brief description, including suitable maps or aerial photographs as appropriate, of the existing land use within and adjacent to the lands applied for, and of known geologic, visual, cultural, or archaeological features, and the known habitat of fish and wildlife, particularly threatened and endangered species, that may be affected by the proposed or reasonably anticipated exploration or mining operations; and

(v) A brief description of the proposed measures to be taken to prevent or control fire, soil erosion, pollution of surface and ground water, damage to fish and wildlife or other natural resources, air and noise pollution, and hazards to public health and safety; to reclaim the surface; and to otherwise meet applicable laws and regulations which the applicant wishes to have considered by the authorized officer.

(c) *Final Showing.* After the permittee receives the technical environmental analysis report and proposed lease form prepared in accordance with § 3521.1-5 of this subpart, he shall submit the following information:

(1) Estimated revenues;

(2) All the estimated costs that a prudent person would consider before deciding to operate a mine, including the cost of:

(i) Developing the mine;

(ii) Removing the mineral;

(iii) Processing necessary to place the mineral in a saleable condition;

(iv) Transporting the mineral product to the point of sale (f.o.b.);

(v) Applicable royalties and taxes; and

(vi) Complying with existing governmental regulations, reclamation and environmental standards, and proposed lease terms;

(3) A comparison of estimated costs and estimated revenues; and

(4) If the permittee intends to mine the deposit in the land covered by the permit as part of a logical mining unit in conjunction with related deposits, the permittee's showing may include the estimated costs and revenues of the combined mining venture.

Published in 41 F.R. 18845, May 7, 1976 - Effective May 7, 1976.

(d) *Additional showing for permits issued for potassium, sodium, and sulphur.* In addition, if the prospecting permit was granted for sodium, sulphur, or potassium, the lease application shall also contain sufficient information to show that the land is chiefly valuable for the development of the mineral deposit discovered.

(e) *Amount of detail required.* The information submitted by the permittee shall be sufficient to enable the authorized officer to ascertain whether the permittee's showing has a reasonable factual basis and supports his assertion that:

(1) He has found commercial quantities of coal if the permit was issued for coal; or

(2) He has found a valuable deposit of the minerals covered by the permit if the permit was issued for a mineral other than coal; and

(3) The land is chiefly valuable for the mineral deposit if the permit was issued for sodium, sulphur, or potassium.

(f) *Rental to be submitted.* The initial application must be accompanied by the first year's rental at the rate of 25 cents per acre or fraction thereof except that:

(1) Sulphur. The application shall be accompanied by the first year's rental at the rate of 50 cents per acre or fraction thereof.

(2) Solid (hardrock) minerals. The application shall be accompanied by a payment of $1 for each acre or fraction thereof included in the application, but not less than $20.

(g) *Action if additional information is needed.* (1) If the permittee has not submitted the information this section requires, the authorized officer shall inform the permittee of the omissions and shall give the permittee an opportunity to submit the necessary information. The request for additional information shall specify:

(i) The information the permittee has failed to provide; and

(ii) The date by which the permittee must submit the omitted information, but the authorized officer shall allow no less than 60 days for a response.

(2) The authorized officer may grant the permittee an extension of time to respond to a request for additional information if the permittee requests an extension before the expiration of the period originally stated.

(3) The authorized officer shall reject the lease application if the permittee does not respond to a request for information on time.

(h) *Action if showing is satisfactory.* The authorized officer shall issue a lease to the permittee, if, after reviewing the lease application, he determines:

(1) That the permittee has presented information that has a reasonable factual basis, and the information supports the permittee's assertion that:

(i) He has found coal in commercial quantities if the permit was issued for coal; or

(ii) He has found a valuable deposit of the mineral covered by the permit if the permit was issued for a mineral other than coal; and

(iii) If the permit was issued for sodium, sulfur, or potassium, that the land is chiefly valuable for the mineral deposit; and

(2) That the permittee has taken into account all the factors required by this section.

(i) *Basis for denial of lease application.* The authorized officer may reject the application and inform the permittee of the grounds for the rejection, or request additional information under the procedures in paragraph (g) of this section if he determines that the evidence submitted by the permittee does not support his assertion that:

(1) He has found commercial quantities of coal if the permit was issued for coal; or

(2) A valuable deposit of the mineral covered by his permit if the permit was issued for mineral other than coal; or

(3) If the permit was issued for sodium, sulphur, or potassium, that the land is chiefly valuable for the mineral deposit.

(j) *Hearing and appeal procedures.* (1) If the permittee's application is rejected, he may file a notice of appeal and statement of reasons for appeal in accordance with the procedures of 43 CFR Part 4.

(2) The permittee shall have a right to a hearing before an Administrative Law Judge in the Office of Hearings and Appeals if he has alleged, in his application, facts sufficient to show that he is entitled to a lease.

(3) At the hearing the permittee shall have both the burden of going forward and the burden of proof, and must show by a preponderance of the evidence that he has discovered coal in commercial quantities, or a valuable deposit of one of the other minerals, and if his application is for a sodium, sulphur or potassium lease, that the land is chiefly valuable for the mineral deposit discovered.

§ 3521.1–4 Technical examination/environmental analysis.

In connection with an application for a lease, the authorized officer, with the assistance of the Mining Supervisor, shall make a technical examination and environmental analysis.

(a) The technical examination shall include: (1) an examination of the technical aspects of the proposed operations set forth in the lease application; and (2) an evaluation of the impacts of such operations on other land uses, resources, or land management programs on or adjacent to the area.

(b) The environmental analysis shall include an analysis of the impact of the proposed operations set forth in lease application.

§ 3521.1–5 Technical examination/environmental analysis report.

(a) Following completion of the technical examination and environmental analysis described in the preceding section, the authorized officer shall prepare a report which sets forth recommendations as to (1) land where reclamation is not attainable or assured; (2) measures required to comply with the reclamation and performance standards set forth in Subpart 3041 of this Chapter; (3) necessary conditions and amounts of bonds to cover estimated reclamation costs for areas that will be disturbed during the initial 5-year period of the lease, permit, or license; (4) any additional, more stringent requirements needed in the lease pursuant to § 3041.2–2(a) of this Subpart; and (5) proposed lease terms and stipulations.

(b) The authorized officer shall send a copy of this report to the lease applicant.

THOMAS S. KLEPPE,
Secretary of the Interior.

[FR Doc.76–13284 Filed 5–6–76;8:45 am]

☆GPO 1976-678-697-664 /8

APPENDIX 3

CHAPTER 78-72

Committee Substitute for House Bill Nos. 1139 and 1321

AN ACT relating to the preservation of native flora; creating s. 581.185, Florida Statutes; providing an endangered plant list; prohibiting the destruction, injury, harvesting, collection, picking, or removal of any plant on such list from certain locations without written permission; requiring a permit issued by the Department of Agriculture and Consumer Services in certain cases; providing a threatened plant list; prohibiting the destruction, injury, harvesting, collection, picking or removal of any plant on such list from certain locations without written permission; prohibiting the transportation and sale of illegally collected plants; requiring written permission and permit to be in immediate possession when destroying, harvesting, removing, transporting, or selling endangered or threatened plants; providing for review of the lists and of said section; providing defenses to prosecution; providing for certain sales by nurserymen; exempting persons engaged in logging and utility operations; providing powers and duties of inspectors and agents of the department; providing for notice by Department of Transportation of highway construction; creating s. 581.186, Florida Statutes; creating the Endangered Plant Advisory Council and prescribing its membership and duties; creating s. 581.187, Florida Statutes; providing exemptions for Florida Indians; amending s. 581.211, Florida Statutes; providing penalties; repealing ss. 865.06 and 865.062, Florida Statutes, which provide for the preservation of wild trees, shrubs, and plants and prescribe violations, penalties, and exemptions; providing an effective date.

Be It Enacted by the Legislature of the State of Florida:

Section 1. Section 581.185, Florida Statutes, is created to read:

581.185 Preservation of native flora of Florida.--

(1) PROHIBITIONS; PERMITS.--

(a) With regard to any plant on the Endangered Plant List provided in subsection (2), it is unlawful for any person:

1. To willfully injure or destroy any such plant growing on the private land of another without first obtaining the written permission of the owner of the land or his legal representative.

2. To willfully injure or destroy any such plant growing on any public land or water without first obtaining the written permission of the superintendent or custodian of such land or water and a permit from the department as provided in this section.

3. To willfully harvest, collect, pick or remove less than three individual plants of a given species listed on the Endangered Plant List from the private land of another without first obtaining the written permission of the owner of the land or his legal representative, or from any public land or water without first obtaining the written permission of the superintendent or custodian of such land or water.

4. To willfully harvest, collect, pick, or remove three or more individual plants of a given species listed on the Endangered Plant List from any native habitat without first obtaining the written permission of the owner of the land or his legal representative or, in the case of

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public land or water, the written permission of the superintendent or custodian of such land or water, and a permit from the department as provided in this section.

5. To transport, carry, or convey on any public road or highway or sell or offer for sale in any place any such plant collected in violation of this section.

(b) With regard to any plant on the Threatened Plant List provided in subsection (3), it is unlawful for any person:

1. To willfully harvest, collect, pick, remove, injure or destroy any such plant growing on the private land of another without first obtaining the written permission of the owner of the land or his legal representative, or to willfully harvest, collect, pick, remove, injure or destroy any such plant growing on any public land or water without first obtaining the written permission of the superintendent or custodian of such land or water.

2. To transport, carry, or convey on any public road or highway or sell or offer for sale in any place any such plant collected in violation of this section.

(c) The purpose of the permitting requirements imposed under paragraph (a) is to encourage the propagation of endangered or depleted species of flora and provide an orderly and controlled procedure for restricting harvesting of native flora from the wilds, thus preventing wanton exploitation or destruction of Florida native plant populations. Permits shall be issued according to rules adopted by the Department of Agriculture and Consumer Services, provided that the written permission of the owner, superintendent, or custodian required by paragraph (a) must be presented as a prerequisite to the issuance of a permit. The department may require such additional justification as it deems necessary when a permit is sought with respect to any plant on the Endangered Plant List which is of very limited distribution, is very rare, or is in imminent danger of becoming extinct in the wilds. Permits may be granted subject to conditions deemed necessary by the department to minimize environmental damage, provide for natural regeneration, protect against erosion or hazard of fire, and ensure that the plants removed are harvested, transported, and stored in such a way that they will be likely to survive and meet the purpose intended when they reach their ultimate destination.

(d) Any person willfully destroying, injuring, harvesting, collecting, picking, or removing any endangered or threatened plant, or transporting, carrying, or conveying any such endangered or threatened plant on any public road or highway, or selling or offering for sale on any place any such endangered or threatened plant must have the permit, if applicable, and the written permission required by this section in his immediate possession at all times when engaged in any of such activities.

(2) ENDANGERED PLANT LIST.--The following plants shall be included in the Endangered Plant List:

[illegible]

(a) Catopsis sp. (bromeliad);

(b) Guzmania sp. (bromeliad);

(c) Tillandsia fasciculata (wild pine bromeliad);

(d) Cereus gracilis (prickly apple cactus);

(e) Cereus robinii (tree cactus);

(f) Cyrtopodium punctatum (cowhorn or cigar orchid);

(g) Encyclia boothiana (epidendrum boothianum) (dollar orchid);

(h) Ionopsis utricularioides (delicate ionopsis orchid);

(i) Maxillaria crassifolia (orchid);

(j) Polyrrhiza lindenii (ghost orchid);

(k) Asplenium auritum (auricled spleenwort) (fern);

(l) Blechnum occidentale (sinkhole fern);

(m) Campyloneurum angustifolium (narrow swamp fern);

(n) Dennstaedtia bipinnata (cuplet fern);

(o) Ophioglossum palmatum (hand fern);

(p) Roystonea elata (Florida royal palm);

(q) Coccothrinax argentata (silver palm);

(r) Rhododendron austrinum (orange azalea);

(s) Rhododendron chapmanii (Chapman's rhododendron);

(t) Guaiacum sanctum (lignumvitae);

(u) Zephyranthes atamasco (atamasco lily or zephyr lily);

(v) Cassia keyensis (Key cassia);

(w) Chionanthus pygmaeus (fringetree or granny-graybeard);

(x) Ribes echinellum (Miccosukee gooseberry);

(y) Strumpfia maritima (pride-of-big-pine);

(z) Taxus floridana (Florida yew);

(aa) Torreya taxifolia (Florida torreya);

(bb) Sarracenia--all species native to the state (pitcher plants);

(cc) Magnolia ashei (Ashe magnolia);

(dd) Magnolia pyramidata (pyramidal magnolia).

30 (3) THREATENED PLANT LIST.--The following plants shall be included in the Threatened Plant List:

(a) Bromeliads--all species of the bromeliad family, sometimes known as air plants, or wild pines, native to the state except Tillandsia usneoides, the Spanish moss, and Tillandsia recurvata, the ball moss, which are specifically excluded from this section, and except those included in the Endangered Plant List under subsection (2);

(b) Cacti--all native species of cacti, except the spreading or prostrate-growing species of Opuntia, which are specifically excluded from this section, and except those included in the Endangered Plant List under subsection (2);

(c) Orchids--all species of the orchid family, both epiphytic and terrestrial, native to the state, except those included in the Endangered Plant List under subsection (2);

(d) Ferns--all species of the fern families native to the state, except Osmunda (cinnamon and royal fern) and Pteris aquilinum (common bracken), which are specifically excluded from this section, and except those included in the Endangered Plant List under subsection (2);

(e) Ilex--all species (holly), except Ilex glabra (gallberry), which is specifically excluded from this section;

(f) Palms--all species of the palm family native to the state, except Serenoa repens (saw palmetto), and except those included in the Endangered Plant List under subsection (2);

(g) Peperomia--all species native to the state (pepper);

(h) Rhododendron--all native species (azalea), except those included in the Endangered Plant List under subsection (2);

(i) Zamia--all species native to the state (coontie);

(j) Zephyranthes--all white species (zephyr lily), except those included in the Endangered Plant List under subsection (2);

(k) Annona glabra (pondapple);

(l) Aristolochia tomentosa (Dutchman's pipe);

(m) Asimina pygmaea (pink pawpaw);

(n) Calycanthus floridus (strawberry bush);

(o) Catesbaea parviflora (dune lily-thorn);

(p) Ceratiola ericoides (sand cedar);

(q) Cercis canadensis (redbud);

(r) Chionanthus virginicus (fringetree or granny-graybeard);

(s) Chrysophyllum olivaeforme (satinleaf);

(t) Cienfuegosia heterophylla (yellow hibiscus);

(u) Clusia rosea (balsam apple);

(v) Commelina gigas (giant dewflower);

(w) Cordia sesbestena (geiger tree);

(x) Cornus florida and Cornus alternifolia (dogwood);

(y) Cupania glabra (cupania);

(z) Epigaea repens (trailing arbutus);

(aa) Erythronium americanum (dogtooth lily or violet);

(bb) Eugenia confusa and E. simpsonii (redberry and Simpson eugenia);

(cc) Garberia fruticosa (garberia);

(dd) Gordonia lasianthus (loblolly-bay);

(ee) Illicium floridanum and Illicium parviflorum (anise shrubs);

(ff) Jacquinia keyensis (joewood);

(gg) Kalmia hirsuta (wicky);

(hh) Kalmia latifolia (mountain laurel);

(ii) Liatris ohlingeri (gayfeather);

(jj) Licaria triandra (gulf licaria);

(kk) Lietneria floridana (corkwood);

(ll) Lilium catesbaei (pine lily);

(mm) Lobelia cardinalis (cardinal flower);

(nn) Malus angustifolia (crabapple);

(oo) Mimusops emarginata (dilly);

(pp) Nemastylis floridana (fall-flowering ixia);

(qq) Asclepias curtisii (sandhill milkweed);

(rr) Pavonia spinifex (yellow hibiscus);

(ss) Cucurbita okeechobiensis (Okeechobee gourd);

(tt) Pinckneya pubens (fevertree);

(uu) Piscidia piscipula (fish-fuddle or Jamaica dogwood);

(vv) Scaevola plumieri (scaevola);

(ww) Smilax smallii (Jackson vine);

(xx) Sphenostigma coelestina (Bartram's ixia);

(yy) Suriana maritima (bay cedar);

(zz) Swietenia mahagoni (mahogany);

(aaa) Tetrazygia bicolor (tetrazygia);

(bbb) Thespesia populnea (mahoe);

(ccc) Tournefortia gnaphalodes (sea-lavender) and Tournefortia hirsutissima (tournefortia).

(4)(a) Beginning in 1980, a comprehensive review of this section and of the lists of plants provided in subsections (2) and (3) shall be made by the department and the Endangered Plant Advisory Council at 4-year intervals. The department shall report to the Legislature its findings and recommendations and those of the Endangered Plant Advisory Council by January 31 prior to the convening of the regular legislative session following each such review, provided that an initial review and report under this section shall be made by January 31, 1980.

(b) The department shall notify the Legislature prior to the next ensuing regular legislative session of any species of plant that should be placed on the Endangered Plant List or the Threatened Plant List which is in danger of disappearing from its native habitat within the foreseeable future throughout all or a significant portion of the range of the species because of:

1. Present or threatened destruction, modification, or curtailment of the range of the species.

2. Overutilization of the species for commercial, scientific, or education purposes.

3. Disease or predation.

4. Any other natural or man-made factor affecting the continued existence of the species.

(c) In carrying out reviews and arriving at recommendations under paragraphs (a) and (b), the department and the advisory council shall use the best scientific and commercial data available and shall consult with interested persons and organizations.

(5) DEFENSE.--In any prosecution under this section it shall be a defense that plants or the flowers, roots, bulbs, or other parts thereof transported, carried, or conveyed or sold or offered for sale by the party were legally imported from another country. In any prosecution under this section involving the destruction, injuring, harvesting, collecting, picking or removing of any plant on the Endangered Plant List or the Threatened Plant List without written permission, it shall be an affirmative defense that actual permission was given prior to such destruction, injury, harvesting, collection, picking, or removal. In any prosecution under this section involving the destruction, injuring, harvesting, collecting, picking or removing of any plant on the Endangered Plant List without written permission and a permit, it shall be an affirmative defense that written permission and a permit had in fact been granted prior to such destruction, injury, harvesting, collection, picking or removal.

(6) SALES BY NURSERYMEN.--Licensed, certified nurserymen who grow from seeds or by vegetative propagation any of the native plants on the Endangered Plant List provided in subsection (2) or the Threatened Plant List provided in subsection (3) are specifically permitted to sell these commercially grown plants and shall not be in violation of this section if they do so, as it is the intent of this section to preserve and encourage the growth of these native plants which are rapidly disappearing from the state.

(7) LOGGING AND UTILITY OPERATIONS.--Any person or business removing, trimming or transporting any of the native plants on the Endangered Plant List provided in subsection (2), or the Threatened Plant List provided in subsection (3), as an incidental part of installing or maintaining a public utility service as defined in s. 876.37(3), or as an incidental part of a logging operation, shall not be in violation of this section.

(8) DUTIES OF PLANT INSPECTORS.--Plant inspectors of the department shall, as part of their regular inspection of nurseries and roadside stands, be on the alert for any of the native plants on the Endangered Plant List provided in subsection (2) or the Threatened Plant List provided in subsection (3), which plants appear suddenly in a given nursery in a mature stage or a stage showing several years of growth, and are empowered to request proof of where and how the plants were obtained.

(9) AGENTS OF DIVISION.--Agents of the Division of Plant Industry shall have the authority to enter upon properties where harvesting or storage of endangered or threatened plants is suspected, to inspect vehicles which may be transporting endangered or threatened plants, and to preserve and take custody of plants harvested or moved in violation of this section, in order to assure compliance with the provisions of this section.

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words in underscored type are additions.

(10) NOTICE OF HIGHWAY CONSTRUCTION.--The Department of Transportation shall notify the Department of Agriculture and Consumer Services and the Endangered Plant Advisory Council created by s. 581.186 of advertised bids for highway construction at the time those bids are first advertised, describing the project, the location of the project, and the representative of the Department of Transportation who can answer questions regarding the project and the plant life immediately affected by the construction. The Department of Agriculture and Consumer Services shall seek and utilize the services of the Endangered Plant Advisory Council and of any other state agencies, clubs, associations or other organizations or individuals that may offer support and services for the preservation of the plants on the Endangered Plant List or Threatened Plant List that may be affected by the construction project, and shall provide by rule for the appropriate disposal of such plants.

Section 2. Section 581.186, Florida Statutes, is created to read:

581.186 Endangered Plant Advisory Council; organization; meetings; quorum; compensation.--

(1) The Endangered Plant Advisory Council is hereby created, consisting of five persons to be appointed by the Commissioner of Agriculture. One member shall be a representative of the Florida Federation of Garden Clubs, Inc., one member shall be a representative of the Florida Nurserymen and Growers Association, Inc., one member shall be a representative of the Committee for Rare and Endangered Plants and Animals, one member shall be a representative of the Florida Forestry Association, and one member shall be a botanist from a Florida university. Members shall be appointed for terms of 4 years, except that the terms of members initially appointed shall expire on June 1, 1980.

(2) Immediately after their appointment, the members of the council shall meet and organize by the election of a chairman, a vice-chairman, and a secretary, each for a term of 1 year.

(3) The council shall meet at the call of its chairman or the department, or at the request of a majority of its membership, and at such times as may be prescribed by its rules.

(4) A majority of the members of the council shall constitute a quorum for all purposes, and an act by a majority of the members present at any meeting at which there is a quorum shall constitute an official act of the advisory council.

(5) The members of the advisory council shall receive no compensation for their services, except that they shall be entitled to receive travel allowances and per diem as provided in s. 112.061, when actually traveling on the business of the council.

(6) The council shall advise the department concerning revising and updating of this section and of the Endangered Plant List and the Threatened Plant List.

(7) The Division of Plant Industry, the Department of Natural Resources, the Department of Transportation, and the Game and Fresh Water Fish Commission shall cooperate with the council whenever necessary to aid it in carrying out its duties under this section.

Section 3. Section 581.187, Florida Statutes, is created to read:

581.187 Exemptions from s. 581.185.--All Florida Indians, as defined in s. 285.11, Florida Statutes, shall be exempt from the prohibitions and penalties of s. 581.185.

Section 4. Section 581.211, Florida Statutes, is amended to read:

581.211 Penalties for violations.--Any person who shall violate any provisions or requirement of this chapter or of the rules made thereunder or of any notice given pursuant thereto, who shall forge, counterfeit, destroy or wrongfully or improperly use any certificate or permit provided for in this chapter or in the rules made pursuant thereto, or who shall interfere with or obstruct any inspector or other employee of the department in the performance of his duties, shall be deemed guilty of a misdemeanor of the first degree, except that any person who shall import from other states, territories, or countries, without a special permit from the Division of Plant Industry, plants or propagative plant parts of the subfamily Aurantioideae (after Swingle and Reese which includes all species of citrus) is guilty of a felony of the third degree, and any person who has in his or her possession such unauthorized imported plants or propagative plant parts shall be deemed guilty of a misdemeanor of the first degree, punishable as provided in s. 775.082, s. 775.083, or s. 775.084.

Section 5. Section 865.06, Florida Statutes, as amended by chapter 77-271, Laws of Florida, and section 865.062, Florida Statutes, are hereby repealed.

Section 6. This act shall take effect July 1, 1978.

Approved by the Governor May 28, 1978.

Filed in Office Secretary of State May 30, 1978.

This public document was promulgated at a base cost of $11.86 per page for 1,500 copies or $.0079 per single page for the purpose of informing the public of Acts passed by the Legislature.

CODING: Words in ~~struck-through~~ type are deletions from existing law; words in underscored type are additions.

APPENDIX 4

FLORIDA ENDANGERED AND THREATENED SPECIES ACT OF 1977

SECTION 1: Short Title - - This act may be cited as the "Florida Endangered and Threatened Species Act of 1977."

SECTION 2: Declaration of Policy - - The Legislature recognizes that the State of Florida harbors a wide diversity of fish and wildlife, and that it is the policy of this state to conserve and wisely manage these resources with particular attention to those species defined by the Game and Fresh Water Fish Commission, or the Department of Natural Resources, or the U.S. Department of the Interior, or successor agencies, as being endangered or threatened. As Florida has more endangered and threatened species than any other continental state, it is the intent of the Legislature to provide for research and management to conserve and protect these species as a natural resource.

SECTION 3: Definitions Used in This Act - -

(1) "Fish and wildlife" means any member of the animal kingdom, including, but not limited to, any mammal, fish, bird, amphibian, reptile, mollusk, crustacean, arthropod, or other invertebrate.

(2) "Endangered species" means any species of fish and wildlife naturally occurring in Florida whose prospects of survival is in jeopardy due to modification or loss of habitat; over-utilization for commercial, sporting, scientific or educational purposes; disease; predation; inadequacy of regulatory mechanisms; or other natural or man-made factors affecting its continued existence.

(3) "Threatened species" means any species of fish and wildlife naturally occurring in Florida which may not be in immediate danger of extinction, but exists in such small populations as to become endangered if it is subjected to increased stress as a result of further modification of its environment.

SECTION 4: Establishment of an Advisory Council - -

(1) The Director of the Game and Fresh Water Fish Commission shall establish an Endangered and Threatened Species Advisory Council consisting of ten members. Six members shall be appointed by the Director of the Game and Fresh Water Fish Commission and four members shall be appointed by the Executive Director of the Department of Natural Resources.

The council shall be composed of representatives from appropriate state agencies, private conservation groups and private citizens with knowledge and experience in fish and wildlife conservation and management. Each member shall be appointed for two years and shall be eligible for reappointment.

(2) The Director of the Game and Fresh Water Fish Commission shall call an organizational meeting of the Endangered and Threatened Species Advisory Council as soon as possible to elect a chairman to preside over council meetings and perform any other duties directed by the council or required by its duly adopted policies and operating procedures. The primary responsibility of the council shall be to:

(a) Provide a communications liaison between council representatives and the staffs of the Game and Fresh Water Fish Commission and the Department of Natural Resources for inventorying, reviewing, and supporting endangered and threatened species conservation and management.

(b) Formulate and recommend to the Director of the Game and Fresh Water Fish Commission and the Executive Director of the Department of Natural Resources rules and policies for endangered and threatened species research and management. Members of the council shall be entitled to receive per diem and expenses for travel as provided for in s. 112.061 while carrying out official business with the council from funds provided to the Game and Fresh Water Fish Commission under this act.

SECTION 5: Interagency Cooperation - -

(1) The Game and Fresh Water Fish Commission shall be responsible for research and management of fresh water and upland species.

(2) The Department of Natural Resources shall be responsible for research and management of marine species.

(3) Recognizing that citizen awareness is a key element in the success of this plan, the Game and Fresh Resources, and the Office of Environmental Education work together to develop a public education program with emphasis on, but not limited to, both public and private schools.

SECTION 6: Annual Report - - The Director of the Game and Fresh Water Fish Commission, in consultation with the Executive Director of the Department of Natural Resources shall, at least 30 days prior to the 1978 session of the Legislature, transmit to the Governor and Cabinet, the President of the Senate, the Speaker of the House of Representatives, and the chairmen of the appropriate Senate and House committees, a plan for management and conservation of endangered and threatened species; including criteria for research and management priorities, a description of the educational program, statewide policies pertaining to protection of endangered and threatened species, additional legislation which may be required, and recommended levels of funding for the following year. A revision and update of this overall management and conservation plan shall be submitted annually, along with a progress report and budget request.

*SECTION 7: Effective Date - - This act shall take effect upon becoming a law.

*This act was signed into law by Governor Reubin O'D. Askew 27 June 1977.

APPENDIX 5

Public Law 95-212
95th Congress

An Act

To authorize appropriations for fiscal years 1978, 1979, and 1980 to carry out State cooperative programs under the Endangered Species Act of 1973.

Dec. 19, 1977
[S. 1316]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That section 6 of the Endangered Species Act of 1973 (16 U.S.C. 1535) is amended—

Endangered Species Act of 1973, amendment.
Cooperative agreements.

(1) by striking out the period at the end of subsection (c) and inserting in lieu thereof "; or", and by adding at the end of such subsection the following:

"that under the State program—

"(A) the requirements set forth in paragraphs (3), (4), and (5) of this subsection are complied with, and

"(B) plans are included under which immediate attention will be given to those resident species of fish and wildlife which are determined by the Secretary or the State agency to be endangered or threatened and which the Secretary and the State agency agree are most urgently in need of conservation programs; except that a cooperative agreement entered into with a State whose program is deemed adequate and active pursuant to subparagraph (A) and this subparagraph shall not affect the applicability of prohibitions set forth in or authorized pursuant to section 4(d) or section 9 (a)(1) with respect to the taking of any resident endangered or threatened species."; and

16 USC 1533.
16 USC 1538.

(2) by amending subsection (i) to read as follows:

Appropriation authorization.

"(i) Appropriations.—For the purposes of this section, there are authorized to be appropriated not to exceed the following sums:

"(1) $10,000,000 through the period ending September 30, 1977.

"(2) $16,000,000 for the period beginning October 1, 1977, and ending September 30, 1981.".

Approved December 19, 1977.

LEGISLATIVE HISTORY:

HOUSE REPORTS: No. 95-333 accompanying H.R. 6405 (Comm. on Merchant Marine and Fisheries) and No. 95-823 (Comm. of Conference).
SENATE REPORTS: No. 95-186 (Comm. on Environment and Public Works) and No. 95-607 (Comm. of Conference).
CONGRESSIONAL RECORD, Vol. 123 (1977):
May 25, considered and passed Senate.
Oct. 18, considered and passed House, amended, in lieu of H.R. 6405.
Nov. 29, Senate agreed to conference report.
Nov. 30, House agreed to conference report.

○

29-139 O - 77 (239)

Public Law 93-205
93rd Congress, S. 1983
December 28, 1973

An Act

To provide for the conservation of endangered and threatened species of fish, wildlife, and plants, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That this Act may be cited as the "Endangered Species Act of 1973 .

Endangered Species Act of 1973.

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FINDINGS, PURPOSES, AND POLICY

SEC. 2. (a) FINDINGS.—The Congress finds and declares that—

(1) various species of fish, wildlife, and plants in the United States have been rendered extinct as a consequence of economic growth and development untempered by adequate concern and conservation;

(2) other species of fish, wildlife, and plants have been so depleted in numbers that they are in danger of or threatened with extinction;

(3) these species of fish, wildlife, and plants are of esthetic, ecological, educational, historical, recreational, and scientific value to the Nation and its people;

(4) the United States has pledged itself as a sovereign state in the international community to conserve to the extent practicable the various species of fish or wildlife and plants facing extinction, pursuant to—

(A) migratory bird treaties with Canada and Mexico;

(B) the Migratory and Endangered Bird Treaty with Japan;

(C) the Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere; 56 Stat. 1354.

(D) the International Convention for the Northwest Atlantic Fisheries; 1 UST 477.

(E) the International Convention for the High Seas Fisheries of the North Pacific Ocean; 4 UST 380.

(F) the Convention on International Trade in Endangered Species of Wild Fauna and Flora; and

(G) other international agreements.

(5) encouraging the States and other interested parties, through Federal financial assistance and a system of incentives, to develop and maintain conservation programs which meet national and international standards is a key to meeting the

Nation's international commitments and to better safeguarding, for the benefit of all citizens, the Nation's heritage in fish and wildlife.

(b) PURPOSES.—The purposes of this Act are to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved, to provide a program for the conservation of such endangered species and threatened species, and to take such steps as may be appropriate to achieve the purposes of the treaties and conventions set forth in subsection (a) of this section.

(c) POLICY.—It is further declared to be the policy of Congress that all Federal departments and agencies shall seek to conserve endangered species and threatened species and shall utilize their authorities in furtherance of the purposes of this Act.

DEFINITIONS

SEC. 3. For the purposes of this Act—

(1) The term "commercial activity" means all activities of industry and trade, including, but not limited to, the buying or selling of commodities and activities conducted for the purpose of facilitating such buying and selling.

(2) The terms "conserve", "conserving", and "conservation" mean to use and the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to this Act are no longer necessary. Such methods and procedures include, but are not limited to, all activities associated with scientific resources management such as research, census, law enforcement, habitat acquisition and maintenance, propagation, live trapping, and transplantation, and, in the extraordinary case where population pressures within a given ecosystem cannot be otherwise relieved, may include regulated taking.

(3) The term "Convention" means the Convention on International Trade in Endangered Species of Wild Fauna and Flora, signed on March 3, 1973, and the appendices thereto.

(4) The term "endangered species" means any species which is in danger of extinction throughout all or a significant portion of its range other than a species of the Class Insecta determined by the Secretary to constitute a pest whose protection under the provisions of this Act would present an overwhelming and overriding risk to man.

(5) The term "fish or wildlife" means any member of the animal kingdom, including without limitation any mammal, fish, bird (including any migratory, nonmigratory, or endangered bird for which protection is also afforded by treaty or other international agreement), amphibian, reptile, mollusk, crustacean, arthropod or other invertebrate, and includes any part, product, egg, or offspring thereof, or the dead body or parts thereof.

(6) The term "foreign commerce" includes, among other things, any transaction—

(A) between persons within one foreign country;

(B) between persons in two or more foreign countries;

(C) between a person within the United States and a person in a foreign country; or

(D) between persons within the United States, where the fish and wildlife in question are moving in any country or countries outside the United States.

(7) The term "import" means to land on, bring into, or introduce into, or attempt to land on, bring into, or introduce into, any

place subject to the jurisdiction of the United States, whether or not such landing, bringing, or introduction constitutes an importation within the meaning of the customs laws of the United States.

(8) The term "person" means an individual, corporation, partnership, trust, association, or any other private entity, or any officer, employee, agent, department, or instrumentality of the Federal Government, of any State or political subdivision thereof, or of any foreign government.

(9) The term "plant" means any member of the plant kingdom, including seeds, roots and other parts thereof.

(10) The term "Secretary" means, except as otherwise herein provided, the Secretary of the Interior or the Secretary of Commerce as program responsibilities are vested pursuant to the provisions of Reorganization Plan Numbered 4 of 1970; except that with respect to the enforcement of the provisions of this Act and the Convention which pertain to the importation or exportation of terrestrial plants, the term means the Secretary of Agriculture.

84 Stat. 2090.
5 USC app.

(11) The term "species" includes any subspecies of fish or wildlife or plants and any other group of fish or wildlife of the same species or smaller taxa in common spatial arrangement that interbreed when mature.

(12) The term "State" means any of the several States, the District of Columbia, the Commonwealth of Puerto Rico, American Samoa, the Virgin Islands, Guam, and the Trust Territory of the Pacific Islands.

(13) The term "State agency" means the State agency, department, board, commission, or other governmental entity which is responsible for the management and conservation of fish or wildlife resources within a State.

(14) The term "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.

(15) The term "threatened species" means any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

(16) The term "United States", when used in a geographical context, includes all States.

DETERMINATION OF ENDANGERED SPECIES AND THREATENED SPECIES

SEC. 4. (a) GENERAL.—(1) The Secretary shall by regulation determine whether any species is an endangered species or a threatened species because of any of the following factors:

(1) the present or threatened destruction, modification, or curtailment of its habitat or range;

(2) overutilization for commercial, sporting, scientific, or educational purposes;

(3) disease or predation;

(4) the inadequacy of existing regulatory mechanisms; or

(5) other natural or manmade factors affecting its continued existence.

(2) With respect to any species over which program responsibilities have been vested in the Secretary of Commerce pursuant to Reorganization Plan Numbered 4 of 1970—

(A) in any case in which the Secretary of Commerce determines that such species should—

(i) be listed as an endangered species or a threatened species, or

(ii) be changed in status from a threatened species to an endangered species,

he shall so inform the Secretary of the Interior, who shall list such species in accordance with this section;

(B) in any case in which the Secretary of Commerce determines that such species should—

(i) be removed from any list published pursuant to subsection (c) of this section, or

(ii) be changed in status from an endangered species to a threatened species,

he shall recommend such action to the Secretary of the Interior, and the Secretary of the Interior, if he concurs in the recommendation, shall implement such action; and

(C) the Secretary of the Interior may not list or remove from any list any such species, and may not change the status of any such species which are listed, without a prior favorable determination made pursuant to this section by the Secretary of Commerce.

(b) BASIS FOR DETERMINATIONS.—(1) The Secretary shall make determinations required by subsection (a) of this section on the basis of the best scientific and commercial data available to him and after consultation, as appropriate, with the affected States, interested persons and organizations, other interested Federal agencies, and, in cooperation with the Secretary of State, with the country or countries in which the species concerned is normally found or whose citizens harvest such species on the high seas; except that in any case in which such determinations involve resident species of fish or wildlife, the Secretary of the Interior may not add such species to, or remove such species from, any list published pursuant to subsection (c) of this section, unless the Secretary has first—

Notice, publication in Federal Register.

(A) published notice in the Federal Register and notified the Governor of each State within which such species is then known to occur that such action is contemplated;

(B) allowed each such State 90 days after notification to submit its comments and recommendations, except to the extent that such period may be shortened by agreement between the Secretary and the Governor or Governors concerned; and

(C) published in the Federal Register a summary of all comments and recommendations received by him which relate to such proposed action.

(2) In determining whether or not any species is an endangered species or a threatened species, the Secretary shall take into consideration those efforts, if any, being made by any nation or any political subdivision of any nation to protect such species, whether by predator control, protection of habitat and food supply, or other conservation practices, within any area under the jurisdiction of any such nation or political subdivision, or on the high seas.

(3) Species which have been designated as requiring protection from unrestricted commerce by any foreign country, or pursuant to any international agreement, shall receive full consideration by the Secretary to determine whether each is an endangered species or a threatened species.

Publication in Federal Register.

(c) LISTS.—(1) The Secretary of the Interior shall publish in the Federal Register, and from time to time he may by regulation revise, a list of all species determined by him or the Secretary of Commerce to be endangered species and a list of all species determined by him or the Secretary of Commerce to be threatened species. Each list shall refer to the species contained therein by scientific and common name or names, if any, and shall specify with respect to each such species over what portion of its range it is endangered or threatened.

(2) The Secretary shall, upon the petition of an interested person under subsection 553(e) of title 5, United States Code, conduct a review of any listed or unlisted species proposed to be removed from or added to either of the lists published pursuant to paragraph (1) of this subsection, but only if he makes and publishes a finding that such person has presented substantial evidence which in his judgment warrants such a review.

Review.
80 Stat. 383.

(3) Any list in effect on the day before the date of the enactment of this Act of species of fish or wildlife determined by the Secretary of the Interior, pursuant to the Endangered Species Conservation Act of 1969, to be threatened with extinction shall be republished to conform to the classification for endangered species or threatened species, as the case may be, provided for in this Act, but until such republication, any such species so listed shall be deemed an endangered species within the meaning of this Act. The republication of any species pursuant to this paragraph shall not require public hearing or comment under section 553 of title 5, United States Code.

80 Stat. 926; 83 Stat. 275, 283.
16 USC 668aa note.

(d) PROTECTIVE REGULATIONS.—Whenever any species is listed as a threatened species pursuant to subsection (c) of this section, the Secretary shall issue such regulations as he deems necessary and advisable to provide for the conservation of such species. The Secretary may by regulation prohibit with respect to any threatened species any act prohibited under section 9(a)(1), in the case of fish or wildlife, or section 9(a)(2), in the case of plants, with respect to endangered species; except that with respect to the taking of resident species of fish or wildlife, such regulations shall apply in any State which has entered into a cooperative agreement pursuant to section 6(a) of this Act only to the extent that such regulations have also been adopted by such State.

Post, p. 893.

(e) SIMILARITY OF APPEARANCE CASES.—The Secretary may, by regulation, and to the extent he deems advisable, treat any species as an endangered species or threatened species even though it is not listed pursuant to section 4 of this Act if he finds that—

(A) such species so closely resembles in appearance, at the point in question, a species which has been listed pursuant to such section that enforcement personnel would have substantial difficulty in attempting to differentiate between the listed and unlisted species;

(B) the effect of this substantial difficulty is an additional threat to an endangered or threatened species; and

(C) such treatment of an unlisted species will substantially facilitate the enforcement and further the policy of this Act.

(f) REGULATIONS.—(1) Except as provided in paragraphs (2) and (3) of this subsection and subsection (b) of this section, the provisions of section 553 of title 5, United States Code (relating to rulemaking procedures), shall apply to any regulation promulgated to carry out the purposes of this Act.

(2)(A) In the case of any regulation proposed by the Secretary to carry out the purposes of this Act—

(i) the Secretary shall publish general notice of the proposed regulation (including the complete text of the regulation) in the Federal Register not less than 60 days before the effective date of the regulation; and

Notice, publication in Federal Register.

(ii) if any person who feels that he may be adversely affected by the proposed regulation files (within 45 days after the date of publication of general notice) objections thereto and requests a public hearing thereon, the Secretary may grant such request, but shall, if he denies such request, publish his reasons therefor in the Federal Register.

Hearing request.

Publication in Federal Register.

80 Stat. 383.

(B) Neither subparagraph (A) of this paragraph nor section 553 of title 5, United States Code, shall apply in the case of any of the following regulations and any such regulation shall, at the discretion of the Secretary, take effect immediately upon publication of the regulation in the Federal Register:

(i) Any regulation appropriate to carry out the purposes of this Act which was originally promulgated to carry out the Endangered Species Conservation Act of 1969.

80 Stat. 926; 83 Stat. 275, 283. 16 USC 668aa note.

(ii) Any regulation (including any regulation implementing section 6(g)(2)(B)(ii) of this Act) issued by the Secretary in regard to any emergency posing a significant risk to the well-being of any species of fish or wildlife, but only if (I) at the time of publication of the regulation in the Federal Register the Secretary publishes therein detailed reasons why such regulation is necessary, and (II) in the case such regulation applies to resident species of fish and wildlife, the requirements of subsection (b)(A), (B), and (C) of this section have been complied with. Any regulation promulgated under the authority of this clause (ii) shall cease to have force and effect at the close of the 120-day period following the date of publication unless, during such 120-day period, the rulemaking procedures which would apply to such regulation without regard to this subparagraph are complied with.

Statement by the Secretary.

(3) The publication in the Federal Register of any proposed or final regulation which is necessary or appropriate to carry out the purposes of this Act shall include a statement by the Secretary of the facts on which such regulation is based and the relationship of such facts to such regulation.

LAND ACQUISITION

SEC. 5. (a) PROGRAM.—The Secretary of the Interior shall establish and implement a program to conserve (A) fish or wildlife which are listed as endangered species or threatened species pursuant to section 4 of this Act; or (B) plants which are concluded in Appendices to the Convention. To carry out such program, he—

70 Stat. 1119. 16 USC 742a note. 60 Stat. 1080; 72 Stat. 563. 16 USC 661 note.

(1) shall utilize the land acquisition and other authority under the Fish and Wildlife Act of 1956, as amended, the Fish and Wildlife Coordination Act, as amended, and the Migratory Bird Conservation Act, as appropriate; and

(2) is authorized to acquire by purchase, donation, or otherwise, lands, waters, or interest therein, and such authority shall be in addition to any other land acquisition authority vested in him.

45 Stat. 1222. 16 USC 460l-4 note.

(b) ACQUISITIONS.—Funds made available pursuant to the Land and Water Conservation Fund Act of 1965, as amended, may be used for the purpose of acquiring lands, waters, or interests therein under subsection (a) of this section.

COOPERATION WITH THE STATES

SEC. 6. (a) GENERAL.—In carrying out the program authorized by this Act, the Secretary shall cooperate to the maximum extent practicable with the States. Such cooperation shall include consultation with the States concerned before acquiring any land or water, or interest therein, for the purpose of conserving any endangered species or threatened species.

(b) MANAGEMENT AGREEMENTS.—The Secretary may enter into agreements with any State for the administration and management of any area established for the conservation of endangered species or threatened species. Any revenues derived from the administration of such areas under these agreements shall be subject to the provisions of section 401 of the Act of June 15, 1935 (49 Stat. 383; 16 U.S.C. 715s). 78 Stat. 701.

(c) Cooperative Agreements.—In furtherance of the purposes of this Act, the Secretary is authorized to enter into a cooperative agreement in accordance with this section with any State which establishes and maintains an adequate and active program for the conservation of endangered species and threatened species. Within one hundred and twenty days after the Secretary receives a certified copy of such a proposed State program, he shall make a determination whether such program is in accordance with this Act. Unless he determines, pursuant to this subsection, that the State program is not in accordance with this Act, he shall enter into a cooperative agreement with the State for the purpose of assisting in implementation of the State program. In order for a State program to be deemed an adequate and active program for the conservation of endangered species and threatened species, the Secretary must find, and annually thereafter reconfirm such finding, that under the State program—

(1) authority resides in the State agency to conserve resident species of fish or wildlife determined by the State agency or the Secretary to be endangered or threatened;

(2) the State agency has established acceptable conservation programs, consistent with the purposes and policies of this Act, for all resident species of fish or wildlife in the State which are deemed by the Secretary to be endangered or threatened, and has furnished a copy of such plan and program together with all pertinent details, information, and data requested to the Secretary;

(3) the State agency is authorized to conduct investigations to determine the status and requirements for survival of resident species of fish and wildlife;

(4) the State agency is authorized to establish programs, including the acquisition of land or aquatic habitat or interests therein, for the conservation of resident endangered species or threatened species; and

(5) provision is made for public participation in designating resident species of fish or wildlife as endangered or threatened.

(d) Allocation of Funds.—(1) The Secretary is authorized to provide financial assistance to any State, through its respective State agency, which has entered into a cooperative agreement pursuant to subsection (c) of this section to assist in development of programs for the conservation of endangered and threatened species. The Secretary shall make an allocation of appropriated funds to such States based on consideration of—

(A) the international commitments of the United States to protect endangered species or threatened species;

(B) the readiness of a State to proceed with a conservation program consistent with the objectives and purposes of this Act;

(C) the number of endangered species and threatened species within a State;

(D) the potential for restoring endangered species and threatened species within a State; and

(E) the relative urgency to initiate a program to restore and protect an endangered species or threatened species in terms of survival of the species.

So much of any appropriated funds allocated for obligation to any State for any fiscal year as remains unobligated at the close thereof is authorized to be made available to that State until the close of the succeeding fiscal year. Any amount allocated to any State which is unobligated at the end of the period during which it is available for expenditure is authorized to be made available for expenditure by the Secretary in conducting programs under this section.

(2) Such cooperative agreements shall provide for (A) the actions to be taken by the Secretary and the States; (B) the benefits that are expected to be derived in connection with the conservation of endangered or threatened species; (C) the estimated cost of these actions: and (D) the share of such costs to be borne by the Federal Government and by the States; except that—

(i) the Federal share of such program costs shall not exceed 66⅔ per centum of the estimated program cost stated in the agreement; and

(ii) the Federal share may be increased to 75 per centum whenever two or more States having a common interest in one or more endangered or threatened species, the conservation of which may be enhanced by cooperation of such States, enter jointly into an agreement with the Secretary.

The Secretary may, in his discretion, and under such rules and regulations as he may prescribe, advance funds to the State for financing the United States pro rata share agreed upon in the cooperative agreement. For the purposes of this section, the non-Federal share may, in the discretion of the Secretary, be in the form of money or real property, the value of which will be determined by the Secretary, whose decision shall be final.

(e) REVIEW OF STATE PROGRAMS.—Any action taken by the Secretary under this section shall be subject to his periodic review at no greater than annual intervals.

(f) CONFLICTS BETWEEN FEDERAL AND STATE LAWS.—Any State law or regulation which applies with respect to the importation or exportation of, or interstate or foreign commerce in, endangered species or threatened species is void to the extent that it may effectively (1) permit what is prohibited by this Act or by any regulation which implements this Act, or (2) prohibit what is authorized pursuant to an exemption or permit provided for in this Act or in any regulation which implements this Act. This Act shall not otherwise be construed to void any State law or regulation which is intended to conserve migratory, resident, or introduced fish or wildlife, or to permit or prohibit sale of such fish or wildlife. Any State law or regulation respecting the taking of an endangered species or threatened species may be more restrictive than the exemptions or permits provided for in this Act or in any regulation which implements this Act but not less restrictive than the prohibitions so defined.

"Establishment period."

(g) TRANSITION.—(1) For purposes of this subsection, the term "establishment period" means, with respect to any State, the period beginning on the date of enactment of this Act and ending on whichever of the following dates first occurs: (A) the date of the close of the 120-day period following the adjournment of the first regular session of the legislature of such State which commences after such date of enactment, or (B) the date of the close of the 15-month period following such date of enactment.

(2) The prohibitions set forth in or authorized pursuant to sections 4(d) and 9(a)(1)(B) of this Act shall not apply with respect to the taking of any resident endangered species or threatened species (other than species listed in Appendix I to the Convention or otherwise specifically covered by any other treaty or Federal law) within any State—

(A) which is then a party to a cooperative agreement with the Secretary pursuant to section 6(c) of this Act (except to the extent that the taking of any such species is contrary to the law of such State); or

(B) except for any time within the establishment period when—

(i) the Secretary applies such prohibition to such species at the request of the State, or

(ii) the Secretary applies such prohibition after he finds, and publishes his finding, that an emergency exists posing a significant risk to the well-being of such species and that the prohibition must be applied to protect such species. The Secretary's finding and publication may be made without regard to the public hearing or comment provisions of section 553 of title 5, United States Code, or any other provision of this Act; but such prohibition shall expire 90 days after the date of its imposition unless the Secretary further extends such prohibition by publishing notice and a statement of justification of such extension. 80 Stat. 383.

(h) Regulations.—The Secretary is authorized to promulgate such regulations as may be appropriate to carry out the provisions of this section relating to financial assistance to States.

(i) Appropriations.—For the purposes of this section, there is authorized to be appropriated through the fiscal year ending June 30, 1977, not to exceed $10,000,000.

INTERAGENCY COOPERATION

Sec. 7. The Secretary shall review other programs administered by him and utilize such programs in furtherance of the purposes of this Act. All other Federal departments and agencies shall, in consultation with and with the assistance of the Secretary, utilize their authorities in furtherance of the purposes of this Act by carrying out programs for the conservation of endangered species and threatened species listed pursuant to section 4 of this Act and by taking such action necessary to insure that actions authorized, funded, or carried out by them do not jeopardize the continued existence of such endangered species and threatened species or result in the destruction or modification of habitat of such species which is determined by the Secretary, after consultation as appropriate with the affected States, to be critical.

INTERNATIONAL COOPERATION

Sec. 8. (a) Financial Assistance.—As a demonstration of the commitment of the United States to the worldwide protection of endangered species and threatened species, the President may, subject to the provisions of section 1415 of the Supplemental Appropriation Act, 1953 (31 U.S.C. 724), use foreign currencies accruing to the United States Government under the Agricultural Trade Development and Assistance Act of 1954 or any other law to provide to any foreign country (with its consent) assistance in the development and management of programs in that country which the Secretary determines to be necessary or useful for the conservation of any endangered species or threatened species listed by the Secretary pursuant to section 4 of this Act. The President shall provide assistance (which includes, but is not limited to, the acquisition, by lease or otherwise, of lands, waters, or interests therein) to foreign countries under this section under such terms and conditions as he deems appropriate. Whenever foreign currencies are available for the provision of assistance

66 Stat. 662.
68 Stat. 454.
7 USC 1691.

under this section, such currencies shall be used in preference to funds appropriated under the authority of section 15 of this Act.

(b) ENCOURAGEMENT OF FOREIGN PROGRAMS.—In order to carry out further the provisions of this Act, the Secretary, through the Secretary of State, shall encourage—

(1) foreign countries to provide for the conservation of fish or wildlife including endangered species and threatened species listed pursuant to section 4 of this Act;

(2) the entering into of bilateral or multilateral agreements with foreign countries to provide for such conservation; and

(3) foreign persons who directly or indirectly take fish or wildlife in foreign countries or on the high seas for importation into the United States for commercial or other purposes to develop and carry out with such assistance as he may provide, conservation practices designed to enhance such fish or wildlife and their habitat.

(c) PERSONNEL.—After consultation with the Secretary of State, the Secretary may—

(1) assign or otherwise make available any officer or employee of his department for the purpose of cooperating with foreign countries and international organizations in developing personnel resources and programs which promote the conservation of fish or wildlife; and

(2) conduct or provide financial assistance for the educational training of foreign personnel, in this country or abroad, in fish, wildlife, or plant management, research and law enforcement and to render professional assistance abroad in such matters.

(d) INVESTIGATIONS.—After consultation with the Secretary of State and the Secretary of the Treasury, as appropriate, the Secretary may conduct or cause to be conducted such law enforcement investigations and research abroad as he deems necessary to carry out the purposes of this Act.

(e) CONVENTION IMPLEMENTATION.—The President is authorized and directed to designate appropriate agencies to act as the Management Authority or Authorities and the Scientific Authority or Authorities pursuant to the Convention. The agencies so designated shall thereafter be authorized to do all things assigned to them under the Convention, including the issuance of permits and certificates. The agency designated by the President to communicate with other parties to the Convention and with the Secretariat shall also be empowered, where appropriate, in consultation with the State Department, to act on behalf of and represent the United States in all regards as required by the Convention. The President shall also designate those agencies which shall act on behalf of and represent the United States in all regards as required by the Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere. 56 Stat. 1354.

PROHIBITED ACTS

SEC. 9. (a) GENERAL.—(1) Except as provided in sections 6(g)(2) and 10 of this Act, with respect to any endangered species of fish or wildlife listed pursuant to section 4 of this Act it is unlawful for any person subject to the jurisdiction of the United States to—

(A) import any such species into, or export any such species from the United States;

(B) take any such species within the United States or the territorial sea of the United States;

(C) take any such species upon the high seas;

(D) possess, sell, deliver, carry, transport, or ship, by any means whatsoever, any such species taken in violation of subparagraphs (B) and (C);

(E) deliver, receive, carry, transport, or ship in interstate or foreign commerce, by any means whatsoever and in the course of a commercial activity, any such species;

(F) sell or offer for sale in interstate or foreign commerce any such species; or

(G) violate any regulation pertaining to such species or to any threatened species of fish or wildlife listed pursuant to section 4 of this Act and promulgated by the Secretary pursuant to authority provided by this Act.

(2) Except as provided in sections 6(g)(2) and 10 of this Act, with respect to any endangered species of plants listed pursuant to section 4 of this Act, it is unlawful for any person subject to the jurisdiction of the United States to—

(A) import any such species into, or export any such species from, the United States;

(B) deliver, receive, carry, transport, or ship in interstate or foreign commerce, by any means whatsoever and in the course of a commercial activity, any such species;

(C) sell or offer for sale in interstate or foreign commerce any such species; or

(D) violate any regulation pertaining to such species or to any threatened species of plants listed pursuant to section 4 of this Act and promulgated by the Secretary pursuant to authority provided by this Act.

(b) SPECIES HELD IN CAPTIVITY OR CONTROLLED ENVIRONMENT.—The provisions of this section shall not apply to any fish or wildlife held in captivity or in a controlled environment on the effective date of this Act if the purposes of such holding are not contrary to the purposes of this Act; except that this subsection shall not apply in the case of any fish or wildlife held in the course of a commercial activity. With respect to any act prohibited by this section which occurs after a period of 180 days from the effective date of this Act, there shall be a rebuttable presumption that the fish or wildlife involved in such act was not held in captivity or in a controlled environment on such effective date.

(c) VIOLATION OF CONVENTION.—(1) It is unlawful for any person subject to the jurisdiction of the United States to engage in any trade in any specimens contrary to the provisions of the Convention, or to possess any specimens traded contrary to the provisions of the Convention, including the definitions of terms in article I thereof.

(2) Any importation into the United States of fish or wildlife shall, if—

(A) such fish or wildlife is not an endangered species listed pursuant to section 4 of this Act but is listed in Appendix II to the Convention,

(B) the taking and exportation of such fish or wildlife is not contrary to the provisions of the Convention and all other applicable requirements of the Convention have been satisfied,

(C) the applicable requirements of subsections (d), (e), and (f) of this section have been satisfied, and

(D) such importation is not made in the course of a commercial activity,

be presumed to be an importation not in violation of any provision of this Act or any regulation issued pursuant to this Act.

(d) IMPORTS AND EXPORTS.—(1) It is unlawful for any person to engage in business as an importer or exporter of fish or wildlife (other than shellfish and fishery products which (A) are not listed pursuant to section 4 of this Act as endangered species or threatened species, and (B) are imported for purposes of human or animal consumption or taken in waters under the jurisdiction of the United States or on the high seas for recreational purposes) or plants without first having obtained permission from the Secretary.

Recordkeeping

(2) Any person required to obtain permission under paragraph (1) of this subsection shall—

(A) keep such records as will fully and correctly disclose each importation or exportation of fish, wildlife, or plants made by him and the subsequent disposition made by him with respect to such fish, wildlife, or plants;

(B) at all reasonable times upon notice by a duly authorized representative of the Secretary, afford such representative access to his places of business, an opportunity to examine his inventory of imported fish, wildlife, or plants and the records required to be kept under subparagraph (A) of this paragraph, and to copy such records; and

(C) file such reports as the Secretary may require.

(3) The Secretary shall prescribe such regulations as are necessary and appropriate to carry out the purposes of this subsection.

(e) REPORTS.—It is unlawful for any person importing or exporting fish or wildlife (other than shellfish and fishery products which (1) are not listed pursuant to section 4 of this Act as endangered or threatened species, and (2) are imported for purposes of human or animal consumption or taken in waters under the jurisdiction of the United States or on the high seas for recreational purposes) or plants to fail to file any declaration or report as the Secretary deems necessary to facilitate enforcement of this Act or to meet the obligations of the Convention.

(f) DESIGNATION OF PORTS.—(1) It is unlawful for any person subject to the jurisdiction of the United States to import into or export from the United States any fish or wildlife (other than shellfish and fishery products which (A) are not listed pursuant to section 4 of this Act as endangered species or threatened species, and (B) are imported for purposes of human or animal consumption or taken in waters under the jurisdiction of the United States or on the high seas for recreational purposes) or plants, except at a port or ports designated by the Secretary of the Interior. For the purpose of facilitating enforcement of this Act and reducing the costs thereof, the Secretary of the Interior, with approval of the Secretary of the Treasury and after notice and opportunity for public hearing, may, by regulation, designate ports and change such designations. The Secretary of the Interior, under such terms and conditions as he may prescribe, may permit the importation or exportation at nondesignated ports in the interest of the health or safety of the fish or wildlife or plants, or for other reasons if, in his discretion, he deems it appropriate and consistent with the purpose of this subsection.

(2) Any port designated by the Secretary of the Interior under the authority of section 4(d) of the Act of December 5, 1969 (16 U.S.C. 668cc-4(d)), shall, if such designation is in effect on the day before the date of the enactment of this Act, be deemed to be a port designated by the Secretary under paragraph (1) of this subsection until such time as the Secretary otherwise provides.

83 Stat. 277.
16 USC 668cc-4.

(g) VIOLATIONS.—It is unlawful for any person subject to the jurisdiction of the United States to attempt to commit, solicit another to commit, or cause to be committed, any offense defined in this section.

EXCEPTIONS

SEC. 10. (a) PERMITS.—The Secretary may permit, under such terms and conditions as he may prescribe, any act otherwise prohibited by section 9 of this Act for scientific purposes or to enhance the propagation or survival of the affected species.

(b) HARDSHIP EXEMPTIONS.—(1) If any person enters into a contract with respect to a species of fish or wildlife or plant before the date of the publication in the Federal Register of notice of consideration of that species as an endangered species and the subsequent listing of that species as an endangered species pursuant to section 4 of this Act will cause undue economic hardship to such person under the contract, the Secretary, in order to minimize such hardship, may exempt such person from the application of section 9(a) of this Act to the extent the Secretary deems appropriate if such person applies to him for such exemption and includes with such application such information as the Secretary may require to prove such hardship; except that (A) no such exemption shall be for a duration of more than one year from the date of publication in the Federal Register of notice of consideration of the species concerned, or shall apply to a quantity of fish or wildlife or plants in excess of that specified by the Secretary; (B) the one-year period for those species of fish or wildlife listed by the Secretary as endangered prior to the effective date of this Act shall expire in accordance with the terms of section 3 of the Act of December 5, 1969 (83 Stat. 275); and (C) no such exemption may be granted for the importation or exportation of a specimen listed in Appendix I of the Convention which is to be used in a commercial activity.

16 USC 668cc-3.

"Undue economic hardship."

(2) As used in this subsection, the term "undue economic hardship" shall include, but not be limited to:

(A) substantial economic loss resulting from inability caused by this Act to perform contracts with respect to species of fish and wildlife entered into prior to the date of publication in the Federal Register of a notice of consideration of such species as an endangered species;

(B) substantial economic loss to persons who, for the year prior to the notice of consideration of such species as an endangered species, derived a substantial portion of their income from the lawful taking of any listed species, which taking would be made unlawful under this Act; or

(C) curtailment of subsistence taking made unlawful under this Act by persons (i) not reasonably able to secure other sources of subsistence; and (ii) dependent to a substantial extent upon hunting and fishing for subsistence; and (iii) who must engage in such curtailed taking for subsistence purposes.

(3) The Secretary may make further requirements for a showing of undue economic hardship as he deems fit. Exceptions granted under this section may be limited by the Secretary in his discretion as to time, area, or other factor of applicability.

Publication in Federal Register.

(c) NOTICE AND REVIEW.—The Secretary shall publish notice in the Federal Register of each application for an exemption or permit which is made under this subsection. Each notice shall invite the submission from interested parties, within thirty days after the date of the notice, written data, views, or arguments with respect to the application. Information received by the Secretary as a part of any application shall be available to the public as a matter of public record at every stage of the proceeding.

(d) PERMIT AND EXEMPTION POLICY.—The Secretary may grant exceptions under subsections (a) and (b) of this section only if he finds and publishes his finding in the Federal Register that (1) such exceptions were applied for in good faith, (2) if granted and exercised will not operate to the disadvantage of such endangered species, and (3) will be consistent with the purposes and policy set forth in section 2 of this Act.

(e) Alaska Natives.—(1) Except as provided in paragraph (4) of this subsection the provisions of this Act shall not apply with respect to the taking of any endangered species or threatened species, or the importation of any such species taken pursuant to this section, by—

(A) any Indian, Aleut, or Eskimo who is an Alaskan Native who resides in Alaska; or

(B) any non-native permanent resident of an Alaskan native village;

if such taking is primarily for subsistence purposes. Non-edible byproducts of species taken pursuant to this section may be sold in interstate commerce when made into authentic native articles of handicrafts and clothing; except that the provisions of this subsection shall not apply to any non-native resident of an Alaskan native village found by the Secretary to be not primarily dependent upon the taking of fish and wildlife for consumption or for the creation and sale of authentic native articles of handicrafts and clothing.

(2) Any taking under this subsection may not be accomplished in a wasteful manner.

Definitions.

(3) As used in this subsection—

(i) The term "subsistence" includes selling any edible portion of fish or wildlife in native villages and towns in Alaska for native consumption within native villages or towns; and

(ii) The term "authentic native articles of handicrafts and clothing" means items composed wholly or in some significant respect of natural materials, and which are produced, decorated, or fashioned in the exercise of traditional native handicrafts without the use of pantographs, multiple carvers, or other mass copying devices. Traditional native handicrafts include, but are not limited to, weaving, carving, stitching, sewing, lacking, beading, drawing, and painting.

(4) Notwithstanding the provisions of paragraph (1) of this subsection, whenever the Secretary determines that any species of fish or wildlife which is subject to taking under the provisions of this subsection is an endangered species or threatened species, and that such taking materially and negatively affects the threatened or endangered species, he may prescribe regulations upon the taking of such species by any such Indian, Aleut, Eskimo, or non-Native Alaskan resident of an Alaskan native village. Such regulations may be established with reference to species, geographical description of the area included, the season for taking, or any other factors related to the reason for establishing such regulations and consistent with the policy of this Act. Such regulations shall be prescribed after a notice and hearings in the affected judicial districts of Alaska and as otherwise required by section 103 of the Marine Mammal Protection Act of 1972, and shall be removed as soon as the Secretary determines that the need for their impositions has disappeared.

86 Stat. 1033.
16 USC 1373.

PENALTIES AND ENFORCEMENT

Sec. 11. (a) Civil Penalties.—(1) Any person who knowingly violates, or who knowingly commits an act in the course of a commercial activity which violates, any provision of this Act, or any provision of any permit or certificate issued hereunder, or of any regulation issued in order to implement subsection (a)(1) (A), (B), (C), (D), (E), or (F), (a)(2) (A), (B), or (C), (c), (d) (other than regulation relating to recordkeeping or filing of reports), (f) or (g) of section 9 of this Act, may be assessed a civil penalty by the Secretary of not more than $10,000 for each violation. Any person who knowingly violates, or who knowingly commits an act in the course of a commercial activity which violates, any provision of any other regulation issued under this Act may be assessed a civil penalty by the Secretary of not more than $5,000 for each such violation. Any person who otherwise violates any provision of this Act, or any regulation, permit, or certificate issued hereunder, may be assessed a civil penalty by the Secretary of not more than $1,000 for each such violation. No penalty may be assessed under this subsection unless such person is given notice and opportunity for a hearing with respect to such violation. Each violation shall be a separate offense. Any such civil penalty may be remitted or mitigated by the Secretary. Upon any failure to pay a penalty assessed under this subsection, the Secretary may request the Attorney General to institute a civil action in a district court of the United States for any district in which such person is found, resides, or transacts business to collect the penalty and such court shall have jurisdiction to hear and decide any such action. The court shall hear such action on the record made before the Secretary and shall sustain his action if it is supported by substantial evidence on the record considered as a whole.

Notice; hearing.

(2) Hearings held during proceedings for the assessment of civil penalties authorized by paragraph (1) of this subsection shall be conducted in accordance with section 554 of title 5, United States Code. The Secretary may issue subpenas for the attendance and testimony of witnesses and the production of relevant papers, books, and documents, and administer oaths. Witnesses summoned shall be paid the same fees and mileage that are paid to witnesses in the courts of the United States. In case of contumacy or refusal to obey a subpena served upon any person pursuant to this paragraph, the district court of the United States for any district in which such person is found or resides or transacts business, upon application by the United States and after notice to such person, shall have jurisdiction to issue an order requiring such person to appear and give testimony before the Secretary or to appear and produce documents before the Secretary, or both, and any failure to obey such order of the court may be punished by such court as a contempt thereof.

80 Stat. 384.

(b) Criminal Violations.—(1) Any person who willfully commits an act which violates any provision of this Act, of any permit or certificate issued hereunder, or of any regulation issued in order to implement subsection (a)(1) (A), (B), (C), (D), (E), or (F); (a)(2) (A), (B), or (C), (c), (d) (other than a regulation relating to recordkeeping, or filing of reports), (f), or (g) of section 9 of this Act shall, upon conviction, be fined not more than $20,000 or imprisoned for not more than one year, or both. Any person who willfully commits an act which violates any provision of any other regulation issued under this Act shall, upon conviction, be fined not more than $10,000 or imprisoned for not more than six months, or both.

(2) The head of any Federal agency which has issued a lease, license, permit, or other agreement authorizing the use of Federal lands, including grazing of domestic livestock, to any person who is convicted of a criminal violation of this Act or any regulation, permit, or certificate issued hereunder may immediately modify, suspend, or revoke each lease, license, permit, or other agreement. The Secretary shall also suspend for a period of up to one year, or cancel, any Federal hunting or fishing permits or stamps issued to any person who is convicted of a criminal violation of any provision of this Act or any

regulation, permit, or certificate issued hereunder. The United States shall not be liable for the payments of any compensation, reimbursement, or damages in connection with the modification, suspension, or revocation of any leases, licenses, permits, stamps, or other agreements pursuant to this section.

(c) DISTRICT COURT JURISDICTION.—The several district courts of the United States, including the courts enumerated in section 460 of title 28, United States Code, shall have jurisdiction over any actions arising under this Act. For the purpose of this Act, American Samoa shall be included within the judicial district of the District Court of the United States for the District of Hawaii.

65 Stat. 725; 72 Stat. 348.

(d) REWARDS.—Upon the recommendation of the Secretary, the Secretary of the Treasury is authorized to pay an amount equal to one-half of the civil penalty or fine paid, but not to exceed $2,500, to any person who furnishes information which leads to a finding of civil violation or a conviction of a criminal violation of any provision of this Act or any regulation or permit issued thereunder. Any officer or employee of the United States or of any State or local government who furnishes information or renders service in the performance of his official duties shall not be eligible for payment under this section.

(e) ENFORCEMENT.—(1) The provisions of this Act and any regulations or permits issued pursuant thereto shall be enforced by the Secretary, the Secretary of the Treasury, or the Secretary of the Department in which the Coast Guard is operating, or all such Secretaries. Each such Secretary may utilize by agreement, with or without reimbursement, the personnel, services, and facilities of any other Federal agency or any State agency for purposes of enforcing this Act.

Federal and State agencies, utilization.

Warrants.

(2) The judges of the district courts of the United States and the United States magistrates may, within their respective jurisdictions, upon proper oath or affirmation showing probable cause, issue such warrants or other process as may be required for enforcement of this Act and any regulation issued thereunder.

Package inspection.

(3) Any person authorized by the Secretary, the Secretary of the Treasury, or the Secretary of the Department in which the Coast Guard is operating, to enforce this Act may detain for inspection and inspect any package, crate, or other container, including its contents, and all accompanying documents, upon importation or exportation. Such person may execute and serve any arrest warrant, search warrant, or other warrant or civil or criminal process issued by any officer or court of competent jurisdiction for enforcement of this Act. Such person so authorized may search and seize, with or without a warrant, as authorized by law. Any fish, wildlife, property, or item so seized shall be held by any person authorized by the Secretary, the Secretary of the Treasury, or the Secretary of the Department in which the Coast Guard is operating pending disposition of civil or criminal proceedings, or the institution of an action in rem for forfeiture of such fish, wildlife, property, or item pursuant to paragraph (4) of this subsection; except that the Secretary may, in lieu of holding such fish, wildlife, property, or item, permit the owner or consignee to post a bond or other surety satisfactory to the Secretary.

Search and seizure, authority.

(4)(A) All fish or wildlife or plants taken, possessed, sold, purchased, offered for sale or purchase, transported, delivered, received, carried, shipped, exported, or imported contrary to the provisions of this Act, any regulation made pursuant thereto, or any permit or certificate issued hereunder shall be subject to forfeiture to the United States.

(B) All guns, traps, nets, and other equipment, vessels, vehicles, aircraft, and other means of transportation used to aid the taking, possessing, selling, purchasing, offering for sale or purchase, transporting, delivering, receiving, carrying, shipping, exporting, or importing of any fish or wildlife or plants in violation of this Act, any regulation made pursuant thereto, or any permit or certificate issued thereunder shall be subject to forfeiture to the United States upon conviction of a criminal violation pursuant to section 11(b)(1) of this Act.

(5) All provisions of law relating to the seizure, forfeiture, and condemnation of a vessel for violation of the customs laws, the disposition of such vessel or the proceeds from the sale thereof, and the remission or mitigation of such forfeiture, shall apply to the seizures and forfeitures incurred, or alleged to have been incurred, under the provisions of this Act, insofar as such provisions of law are applicable and not inconsistent with the provisions of this Act; except that all powers, rights, and duties conferred or imposed by the customs laws upon any officer or employee of the Treasury Department shall, for the purposes of this Act, be exercised or performed by the Secretary or by such persons as he may designate.

(f) REGULATIONS.—The Secretary, the Secretary of the Treasury, and the Secretary of the Department in which the Coast Guard is operating, are authorized to promulgate such regulations as may be appropriate to enforce this Act, and charge reasonable fees for expenses to the Government connected with permits or certificates authorized by this Act including processing applications and reasonable inspections, and with the transfer, board, handling, or storage of fish or wildlife or plants and evidentiary items seized and forfeited under this Act. All such fees collected pursuant to this subsection shall be deposited in the Treasury to the credit of the appropriation which is current and chargeable for the cost of furnishing the services. Appropriated funds may be expended pending reimbursement from parties in interest.

(g) CITIZEN SUITS.—(1) Except as provided in paragraph (2) of this subsection any person may commence a civil suit on his own behalf—

(A) to enjoin any person, including the United States and any other governmental instrumentality or agency (to the extent permitted by the eleventh amendment to the Constitution), who is alleged to be in violation of any provision of this Act or regulation issued under the authority thereof; or

(B) to compel the Secretary to apply, pursuant to section 6(g)(2)(B)(ii) of this Act, the prohibitions set forth in or authorized pursuant to section 4(d) or section 9(a)(1)(B) of this Act with respect to the taking of any resident endangered species or threatened species within any State.

The district courts shall have jurisdiction, without regard to the amount in controversy or the citizenship of the parties, to enforce any such provision or regulation, as the case may be. In any civil suit commenced under subparagraph (B) the district court shall compel the Secretary to apply the prohibition sought if the court finds that the allegation that an emergency exists is supported by substantial evidence. Jurisdiction.

(2)(A) No action may be commenced under subparagraph (1)(A) of this section—

(i) prior to sixty days after written notice of the violation has been given to the Secretary, and to any alleged violator of any such provision or regulation;

(ii) if the Secretary has commenced action to impose a penalty pursuant to subsection (a) of this section; or

(iii) if the United States has commenced and is diligently prosecuting a criminal action in a court of the United States or a State to redress a violation of any such provision or regulation.

(B) No action may be commenced under subparagraph (1)(B) of this section—

(i) prior to sixty days after written notice has been given to the Secretary setting forth the reasons why an emergency is thought to exist with respect to an endangered species or a threatened species in the State concerned; or

(ii) if the Secretary has commenced and is diligently prosecuting action under section 6(g)(2)(B)(ii) of this Act to determine whether any such emergency exists.

(3)(A) Any suit under this subsection may be brought in the judicial district in which the violation occurs.

Intervention.

(B) In any such suit under this subsection in which the United States is not a party, the Attorney General, at the request of the Secretary, may intervene on behalf of the United States as a matter of right.

Litigation costs.

(4) The court, in issuing any final order in any suit brought pursuant to paragraph (1) of this subsection, may award costs of litigation (including reasonable attorney and expert witness fees) to any party, whenever the court determines such award is appropriate.

Injunctive relief.

(5) The injunctive relief provided by this subsection shall not restrict any right which any person (or class of persons) may have under any statute or common law to seek enforcement of any standard or limitation or to seek any other relief (including relief against the Secretary or a State agency).

46 Stat. 689.
19 USC 1654.

46 Stat. 741.

(h) Coordination With Other Laws.—The Secretary of Agriculture and the Secretary shall provide for appropriate coordination of the administration of this Act with the administration of the animal quarantine laws (21 U.S.C. 101–105, 111–135b, and 612–614) and section 306 of the Tariff Act of 1930 (19 U.S.C. 1306). Nothing in this Act or any amendment made by this Act shall be construed as superseding or limiting in any manner the functions of the Secretary of Agriculture under any other law relating to prohibited or restricted importations or possession of animals and other articles and no proceeding or determination under this Act shall preclude any proceeding or be considered determinative of any issue of fact or law in any proceeding under any Act administered by the Secretary of Agriculture. Nothing in this Act shall be construed as superseding or limiting in any manner the functions and responsibilities of the Secretary of the Treasury under the Tariff Act of 1930, including, without limitation, section 527 of that Act (19 U.S.C. 1527), relating to the importation of wildlife taken, killed, possessed, or exported to the United States in violation of the laws or regulations of a foreign country.

ENDANGERED PLANTS

Sec. 12. The Secretary of the Smithsonian Institution, in conjunction with other affected agencies, is authorized and directed to review (1) species of plants which are now or may become endangered or threatened and (2) methods of adequately conserving such species, and to report to Congress, within one year after the date of the enactment of this Act, the results of such review including recommendations for new legislation or the amendment of existing legislation.

Report to Congress.

87 STAT. 901
87 STAT. 902

CONFORMING AMENDMENTS

SEC. 13. (a) Subsection 4(c) of the Act of October 15, 1966 (80 Stat. 928, 16 U.S.C. 668dd(c)), is further amended by revising the second sentence thereof to read as follows: "With the exception of endangered species and threatened species listed by the Secretary pursuant to section 4 of the Endangered Species Act of 1973 in States wherein a cooperative agreement does not exist pursuant to section 6(c) of that Act, nothing in this Act shall be construed to authorize the Secretary to control or regulate hunting or fishing of resident fish and wildlife on lands not within the system."

Ante, p. 886.

(b) Subsection 10(a) of the Migratory Bird Conservation Act (45 Stat. 1224, 16 U.S.C. 715i(a)) and subsection 401(a) of the Act of June 15, 1935 (49 Stat. 383, 16 U.S.C. 715s(a)), are each amended by striking out "threatened with extinction," and inserting in lieu thereof the following: "listed pursuant to section 4 of the Endangered Species Act of 1973 as endangered species or threatened species,".

80 Stat. 929.
80 Stat. 930.

(c) Section 7(a)(1) of the Land and Water Conservation Fund Act of 1965 (16 U.S.C. 460l—9(a)(1)) is amended by striking out:

> "THREATENED SPECIES.—For any national area which may be authorized for the preservation of species of fish or wildlife that are threatened with extinction."

78 Stat. 897;
86 Stat. 459.

and inserting in lieu thereof the following:

> "ENDANGERED SPECIES AND THREATENED SPECIES.—For lands, waters, or interests therein, the acquisition of which is authorized under section 5(a) of the Endangered Species Act of 1973, needed for the purpose of conserving endangered or threatened species of fish or wildlife or plants."

(d) The first sentence of section 2 of the Act of September 28, 1962, as amended (76 Stat. 653, 16 U.S.C. 460k-1), is amended to read as follows:

Conservation areas.
86 Stat. 1063.

"The Secretary is authorized to acquire areas of land, or interests therein, which are suitable for—

"(1) incidental fish and wildlife-oriented recreational development,

"(2) the protection of natural resources,

"(3) the conservation of endangered species or threatened species listed by the Secretary pursuant to section 4 of the Endangered Species Act of 1973, or

"(4) carrying out two or more of the purposes set forth in paragraphs (1) through (3) of this section, and are adjacent to, or within, the said conservation areas, except that the acquisition of any land or interest therein pursuant to this section shall be accomplished only with such funds as may be appropriated therefor by the Congress or donated for such purposes, but such property shall not be acquired with funds obtained from the sale of Federal migratory bird hunting stamps."

87 STAT. 902
87 STAT. 903
86 Stat. 1027.

(e) The Marine Mammal Protection Act of 1972 (16 U.S.C. 1361–1407) is amended—

16 USC 1362.
Ante, p. 884.

(1) by striking out "Endangered Species Conservation Act of 1969" in section 3(1)(B) thereof and inserting in lieu thereof the following: "Endangered Species Act of 1973";

16 USC 1402.

(2) by striking out "pursuant to the Endangered Species Conservation Act of 1969" in section 101(a)(3)(B) thereof and inserting in lieu thereof the following: "or threatened species pursuant to the Endangered Species Act of 1973";

(3) by striking out "endangered under the Endangered Species Conservation Act of 1969" in section 102(b)(3) thereof and inserting in lieu thereof the following: "an endangered species or threatened species pursuant to the Endangered Species Act of 1973"; and

(4) by striking out "of the Interior such revisions of the Endangered Species List, authorized by the Endangered Species Conservation Act of 1969," in section 202(a)(6) thereof and inserting in lieu thereof the following: "such revisions of the endangered species list and threatened species list published pursuant to section 4(c)(1) of the Endangered Species Act of 1973".

86 Stat. 973.
7 USC 136 note.

(f) Section 2(l) of the Federal Environmental Pesticide Control Act of 1972 (Public Law 92–516) is amended by striking out the words "by the Secretary of the Interior under Public Law 91–135" and inserting in lieu thereof the words "or threatened by the Secretary pursuant to the Endangered Species Act of 1973".

REPEALER

80 Stat. 926.
83 Stat. 275.

Sec. 14. The Endangered Species Conservation Act of 1969 (sections 1 through 3 of the Act of October 15, 1966, and sections 1 through 6 of the Act of December 5, 1969; 16 U.S.C. 668aa—668cc–6), is repealed.

AUTHORIZATION OF APPROPRIATIONS

Sec. 15. Except as authorized in section 6 of this Act, there are authorized to be appropriated—

(A) not to exceed $4,000,000 for fiscal year 1974, not to exceed $8,000,000 for fiscal year 1975 and not to exceed $10,000,000 for fiscal year 1976, to enable the Department of the Interior to carry out such functions and responsibilities as it may have been given under this Act; and

(B) not to exceed $2,000,000 for fiscal year 1974, $1,500,000 for fiscal year 1975 and not to exceed $2,000,000 for fiscal year 1976, to enable the Department of Commerce to carry out such functions and responsibilities as it may have been given under this Act.

EFFECTIVE DATE

Sec. 16. This Act shall take effect on the date of its enactment.

MARINE MAMMAL PROTECTION ACT OF 1972

SEC. 17. Except as otherwise provided in this Act, no provision of this Act shall take precedence over any more restrictive conflicting provision of the Marine Mammal Protection Act of 1972. 86 Stat. 1027. 16 USC 1361 note.

Approved December 28, 1973.

LEGISLATIVE HISTORY:

HOUSE REPORTS: No. 93-412 (Comm. on Merchant Marine and Fisheries) and No. 93-740 (Comm. of Conference).
SENATE REPORT No. 93-307 (Comm. on Commerce).
CONGRESSIONAL RECORD, Vol. 119 (1973):
July 24, considered and passed Senate.
Sept. 18, considered and passed House, amended, in lieu of H. R. 37.
Dec. 19, Senate agreed to conference report.
Dec. 20, House agreed to conference report.
WEEKLY COMPILATION OF PRESIDENTIAL DOCUMENT, Vol. 10, No. 1 (1974):
Dec. 28, 1973, Presidential statement.

○

APPENDIX 6

U.S. Forest Service

List of Vertebrates of Known or Suspected Occurrence on the Osceola National Forest

Amphibians

Oak toad
Eastern narrow-mouthed toad
Piney woods tree frog
Little grass frog
Florida cricket frog
Southern leopard frog
Green frog
River frog
Mole salamander
Tiger salamander
Striped newt
Bronze frog
Carpenter frog
Southern chorus frog
Two-toed amphiuma
Rusty mud salamander
Central newt
Eastern lesser siren
Southern toad
Barking tree frog
Green tree frog
Spring peeper
Ornate chorus frog
Bullfrog
Pig frog
Eastern spadefoot toad
Slimy salamander
Southern Dusky salamander
Common newt
Gopher frog
Squirrel treefrog
Flatwoods salamander
Dwarf salamander
Many lined salamander
Dwarf siren
Greater siren

Reptiles

Peninsula ribbon snake
Gopher tortoise
Snapping turtle
Loggerhead musk turtle
Florida red-bellied turtle
Florida red-bellied turtle
Six-lined race runner
Southeastern five-lined skink
Eastern fence lizard
Florida worm lizard
American alligator
Black snake
Short-tailed snake
Florida crowned snake
Eastern smooth earth snake
Box turtle
Spiney softshell
Stinkpot
Florida cooter
Florida red-tailed skink
Green anole
Eastern glass lizard
Broad headed skink
Eastern indigo snake
Eastern garter snake
Eastern coachwhip snake

Florida Pine snake
Rough earth snake
Yellow-lipped snake
Eastern diamond-back rattlesnake
Canebrake rattlesnake
Rainbow snake
Yellow-bellied turtle
Pine woods snake
Black swamp snake
Spotted turtle
Striped mud turtle
Southern fence lizard
Ground skink
Southern black racer
Corn snake
Eastern hognose snake
Kingsnake
Florida green water snake
Florida water snake
Striped swamp snake

Yellow rat snake
Worm snake
Rough green snake
Eastern coral snake
Dusky Pigmy rattlesnake
Mud snake
Florida Cottonmouth moccasin
Suwanee cooter
Florida red-bellied snake
Eastern chicken turtle
Island glass lizard
Northern mole skink
Northern scarlet snake
Southern ringneck snake
Eastern mud snake
Southern hognose snake
Scarlet kingsnake
Red-bellied water snake
Brown water snake
Eastern glossy water snake

Mammals

Virginia oppossum
Shorttail shrew
Southeastern mole
Eastern pipistrel
Big brown bat
Seminole bat
Eastern big-eared bat
Florida black bear
Southeastern weasel
River otter
Striped skunk
Florida panther
Sherman's fox squirrel
Southern flying squirrel
Eastern gray squirrel
Beaver
Golden mouse
Cotton mouse
Black rat
Eastern wood rat
Hispid cotton rat
Southeastern pocket gopher
Eastern cottontail
Whitetail dear
Feral hot

Least shrew
Southeastern shrew
Gray bat
Red bat
Hoary bat
Evening bat
Florida yellow bat
Raccoon
Southern mink
Spotted skunk
Gray fox
Bobcat
Eastern gray squirrel
Beaver
Southern flying squirrel
Eastern harvest mouse
Oldfield mouse
House mouse
Norway rat
Rice rat
Pine vole
Round-tailed muskrat
Marsh rabbit
Nine-banded armadillo
Domestic cow

Birds

Pie-billed grebe
Anhinga
Green heron
Cattle egret
Snowy egret
Least bittern
Wood stork
Blue-winged teal
Ring-necked duck
Bufflehead
Ruddy duck
Hooded merganser
Red-breasted merganser
Turkey vulture
Black vulture
Sharp-shinned hawk
Cooper's hawk
Red-tailed hawk
Red-shouldered hawk
Bald eagle
Marsh hawk
Osprey
Arctic peregrine falcon
Southeastern kestrel
Bobwhite
Turkey
Sandhill crane
Common Gallinule
American coot
Killdeer
Common snipe
Spotted sandpiper
Solitary sandpiper
Greater yellow legs
Rock dove
Mourning dove
Ground dove
Yellow-billed cuckoo
Barn owl
Screech owl
Ruby-crowned kinglet
Cedar axwing
Loggerhead shrike
Starling
White-eyed vireo
Red-eyed vireo
Black-and-white warbler
Double-crested cormorant
Great blue heron
Little blue heron
Great egret
Louisiana heron
American bittern
Green-winged teal
Wood duck
Great horned owl
Barred owl
Chuck-will's-widow
Common night hawk
Chimney swift
Ruby-throated humming bird
Belted kingfisher
Common flicker
Pileated woodpecker
Red-bellied woodpecker
Red-headed woodpecker
Yellow-bellied sapsucker
Hairy woodpecker
Downy woodpecker
Red-cockaded woodpecker
Eastern kingbird
Great-creasted flycatcher
Eastern phoebe
Eastern wood pewee
Tree swallow
Barn swallow
Purple martin
Blue jay
Common crow
Fish crew
Carolina chickadee
Tufted titmouse
Brown-headed nuthatch
House wren
Carolina wren
Long-billed marsh wren
Florida wren
Mockingbird
Gray catbird
Brown thrasher
American robin
Hermit thrush
Eastern bluebird
Blue-gray gnatcatcher

Prothonotary warbler
Northern parula warbler
Yellow-throated warbler
Pine warbler
Palm warbler
Ovenbird
Hooded warbler
House sparrow
Eastern meadowlark
Boat-tailed grackle
Brown-headed cowbird
Cardinal
Indigo bunting
Rufous-sided towhee
Vesper sparrow
Dark-eyed junco
Chipping sparrow
White-crowned sparrow
Swamp sparrow
Golden-crowned kinglet
Yellow-rumped warbler
Chestnut-sided warbler
Prairie warbler
Backman's warbler
Common yellowthroat
American redstart
Bobolink
Red-winged blackbird
Common grackle
Summer tanager
Blue grosbeak
American goldfinch
Savannah sparrow
Backman's sparrow
Chipping sparrow
Field sparrow
White-throated sparrow
Song sparrow

Fish

Longnose gar
Florida gar
Bowfin
American shad
Gizzard shad
Redfin pickerel
Chain pickerel
Redeye chub
Golden shiner
Ironcolor shiner
Dusky shiner
Taillight shiner
Sailfin shiner
Channel catfish
Yellow bullhead
Brown bullhead
Skeckled madtom
Golden topminnow
Starhead topminnow
Least killifish
Johnny darter
Blackbanded darter
Pugnose minnow
Coastal shiner
Lake chubsucker
Spotted sucker
Mosquitofish
Sailfin molly
Pirate perch
Okefenokee pigmy sunfish
Spotted sunfish
Dollar sunfish
Redear sunfish
Red breast sunfish
Warmouth
Flier
Blackbanded sunfish
Black crappie
Largemouth bass
Suwannee bass
American eel
Brook silverside
Tadpole madtom
Banded topminnow
Seminole killifish
Brown darter
Swamp darter
Bluegill
Eastern mudminnow
Speckled madtom
Pirate perch
Redfin killifish

White catfish
Mosquito fish
Tidewater silversides
Mud sunfish
Banded sunfish
Yellowbelly sunfish
Oscellated killifish
Redtailed killifish
Everglades pigmy sunfish
Okefenokee pigmy sunfish
Banded pigmy sunfish
Blue-spotted sunfish

RULES

OF THE

DEPARTMENT OF ENVIRONMENTAL REGULATION

CHAPTER 17-9

MINIMUM REQUIREMENTS FOR EARTHEN DAMS, PHOSPHATE MINING AND PROCESSING OPERATIONS

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17-9.01 General. It is the conclusion of the Environmental Regulation Commission that the most common causes for past failures of earthen dams used for impoundment of liquid industrial wastes from phosphate mining and processing operations have been insecure foundations, inadequate supervision of construction, poor routine inspections, and/or inadequate maintenance. It is the intent of the Board to establish requirements which will eliminate or reduce failures of earthen dams to the lowest possible manner. This rule, therefore, emphasizes an intensive surveillance program which is designed to expose critical conditions in dams sufficiently in advance of failure to permit corrective maintenance and avoidance of diaster. It shall be incumbent upon owners of earthen dams to construct and maintain them on the basis that these requirements are minimum safety standards which shall normally be exceeded to ensure that there shall be no discharge from said dams into the waters of the State of Florida other than that specifically authorized by the Department of Environmental Regulation. All earthen dams for impounding, above natural ground elevation, liquid industrial wastes from phosphate mining and processing operations shall be constructed in accordance with a design and set of detailed specifications prepared, sealed and signed by a professional engineer registered in Florida who is competent in the field of dam design, construction and maintenance. Results of field and laboratory tests from an adequate number of test borings and soil samples shall be the basis for computations pertaining to seepage and stability analyses. Construction specifications contained in this rule shall apply to dams on which construction begins after the effective date of the rule. Inspection and maintenance specifications contained in this rule shall apply to all active and retired phosphate industry dams immediately upon the effective date of the rule.

Specific Authority 403.061(25) FS. Law Implemented 403.061(25) FS. History—Revised 12-8-72.

17-9.02 Definitions.

(1) Abandoned dam — An abandoned dam is one associated with a settling area from which sufficient water has been removed to make the residue no longer a pollutional threat to surface waters or a hazard of any type to land areas.

(2) Active dam — An active dam is one associated with a settling area into which wastewater is being introduced for purposes of clarification or in which free water remains in contact with the dam.

(3) Berm — A shelf that breaks the continuity of the slope of an embankment in order to arrest the velocity of storm water flowing down the face and/or to enhance the stability of the embankment.

(4) Cast dam — A cast dam is one constructed of fill which was put in place by a dragline or other machine capable of free dumping, and is not mechanically compacted in progressive layers.

(5) Core — A zone of relatively impervious material within the dam to resist the flow of water through the dam.

(6) Cut-off-Trench — An excavation into the foundation material to accept an extension of the core.

(7) Drain — A material more pervious than the dam which allows seepage water to drain freely from the dam while preventing piping or internal erosion of the fill material.

(a) Blanket drain is a continuous horizontal drain layer within or beneath the downstream portion of the dam.

(b) Chimney drain is a continuous sloping drain layer within the downstream portion of the dam.

(c) Toe drain is a wedge-shaped drain supporting the downstream toe of the dam.

(8) Earthen dam — A barrier to the flow of liquids which is constructed of naturally occurring soil.

(9) Filter — A zone of material sufficiently more pervious than the dam or foundation so that free water will drain through the filter, but at the same time sufficiently fine grained to prevent piping of the fill material.

(10) Freeboard — The height of the lowest point on the crest of the dam above the highest adjacent liquid surface within the impoundment.

(11) Inside (upstream) slope — The face of the dam which will be in contact with the impounded liquids.

(12) Outside (downstream) slope — The face of the dam which will not be in contact with the impounded liquids.

(13) Phreatic Surface — The upper surface of the water table within the mass of the dam. It would be the elevation of the water surface if an open hole were dug into the dam.

(14) Piping — Progressive erosion of soil within the dam, starting downstream and working upstream, creating a tunnel into the dam. Piping occurs when the velocity of the flow of seepage water is sufficient for the water to transport material from the embankment.

(15) Retired dam — A retired dam is one associated with a settling area into which no additional wastewater is currently being introduced but which could be reactivated.

(16) Rolled dam — A rolled dam is one constructed of fill which is placed in layers which are mechanically compacted individually prior to placement of the next higher layer.

(17) Safety Factor — A numerical value which represents the ratio of the ultimate strength of a material or structure to the stress which will be applied to that material or structure.

(18) Settling area — The area surrounded by dikes, embankments, or natural soil masses into which liquids are introduced for the purpose of separating suspended solid matters from water used for transportation of such matter.

(19) Tailwater level — The elevation of the water at the downstream toe of the dam.

(20) Toe — The toe of the dam is the junction between the face of the dam and the adjacent terrain.

Specific Authority 403.061(25) FS. Law Implemented 403.061(25) FS. History—Revised 12-8-72.

17-9.03 Construction of New dams.

(1) Design.

(a) Site investigation — The general area desired for use as a settling area shall be carefully inspected by the design engineer prior to selection of the exact location for a dam. Areas of uneven natural subsidence, sink-hole, pockets of organic matter, or other unstable soils shall be avoided, unless special provisions are made for their correction.

(b) Soil testing — A program of soil sampling and testing adequate to determine the characteristics of the foundation material which will support the proposed dam and of the material to be used for construction of the dam shall be performed. Sampling shall include borings and/or in-place samples from the exposed excavation face. All borings shall be logged using a recognized engineering soil classification system, (such as Unified System) with location and depths of all samples recorded on the log. Tests including, but not limitied to, the determination of in-place densities, shear-strength; and permeabilities of the foundation and embankment soils shall be performed. Tests on foundation soils shall be performed on either undisturbed samples or on the in-place soil. Tests on embankment soils shall be performed on samples remolded to the densities to be used in construction. All soil test data used for design shall be derived from tests performed in compliance with the American Society of Testing Materials, American Association of State Highway Officials, or U.S. Army Corps of Engineers soil testing specifications and procedures.

(c) Cross Section design — There shall be a minimum freeboard of five feet (5′) below the inside crest. The outside crest of the top of the dam shall be higher than the inside crest in order to force all crest drainage to the inside of the dam. Both inside and outside slopes shall be no steeper than two horizontal to one vertical. The design shall provide positive seepage control features, such as but not limited to:

(i) Cut-off trench in natural soil foundations.

(ii) Clay core.

(iii) Blanket drain.

(iv) Chimney drain and toe drain. The top of the dam shall include a roadway which will permit wheeled vehicle traffic at all times. The design shall also incorporate a roadway near the downstream toe which will permit wheeled vehicle traffic around the perimeter of the dam for purposes of inspection of the slope, toe and natural ground beyond the toe, as well as maintenance.

(d) Stability analysis — A flow net analysis shall be made to determine the location of the phreatic surface, flow lines, and lines of equal head within the foundation and fill being designed. This analysis may be based on graphical construction, electrical or liquid analogs, soil prototype methods, or other accepted methods. The flow net and stability analysis shall use the maximum pool elevation with not less than five feet (5′) of clear water, this elevation being five feet (5′) below the inside crest of the dam. Possible fluctuations of the tail water level shall be included in the analyses.

(e) Design safety factors — The designing engineer shall use the following minimum safety factors: 1.75 for horizontal shear at base of fill; 1.5 for horizontal shear within the fill due to seepage through the outer face; 1.5 for bearing capacity of foundation soils; 1.5 for protection against shear failure of any circular arc in either inside or outside slope. It is imperative that water pressure distribution be included in the analyses.

(f) If a cast dam is to be constructed where adequate site preparation, as defined in Section 17-9.03(2) below, has not been accomplished; or where the fill materials do not meet the requirements of Section 17-9.03(3) below; then the design shall incorporate either of the following alternatives:

(i) A portion of the material which forms the downstream slope shall be removed and the foundation thus exposed shall be prepared in the same manner as is prescribed herein for a rolled dam. Fill material shall then be placed as a rolled embankment which shall be of such design that the safety factor with respect to downstream movement of the rolled section shall be no less than 1.2 when assuming that the remaining cast material below the phreatic surface has become liquid.

(ii) Sand tailings shall be placed against the downstream slope to the extent that the wedge so formed shall have a safety factor with respect to downstream movement of no less than 1.2 when assuming that the cast material below the phreatic surface has become liquid.

(g) When the foundation for a cast dam meets the requirements of Section 17-9.03(2) and the materials used for the fill meet the requirements of Section 17-9.03(3), then the dam shall be designed in accordance with sections 17-9.03(1)(a)(b)(c)(d) and (e); except that the computations of all required safety factors shall be based on only seventy-five percent (75%) of the indicated strengths of the cast materials which are tested at the same density as will exist within the dam.

(2) Site Preparation — Ground which will become the foundation of earthen dams shall be stripped of all vegetation and organic detritus or residue, including muck, mud, slimes, or other material which would flow or undergo excessive consolidation under heavy loading. All earth foundation surfaces on which fill is to be placed shall be scarified or moistened and compacted prior to spreading of first course of fill material, and the dam base shall be well drained during construction, except when placing hydraulic fill.

(3) Material to be Used — Material used for earthen dams shall be free of stumps, vegetation, trees, palmettos, muck, and other extraneous matter which could affect the compactability, density, permeability, or shear strength of the finished dam. Tailings may be used for dam fill when such a completed dam will meet the seepage and structural requirements in Section 17-9.03(1).

(4) Water level control — Sufficient water level control structures shall be installed in the impoundment area behind an earthen dam to maintain the minimum 5′ freeboard and to accomodate the release of storm water resulting from heavy rainfall. Such structures shall be adequate to accomodate twelve (12) inches of rainfall on the watershed involved during any period of twenty-four (24) hours. All settling areas covering an area greater than fifty (50) acres shall have no fewer than two (2) water level control structures.

(5) Methods of Construction

(a) Each new dam shall be constructed to meet or exceed the minimum safety requirements of the specifications and design for that dam. Draglines, drag scrapers, tractor or other appropriate earthmoving equipment shall be used to place materials in dam construction. Materials used in rolled dams shall be blended prior to compaction. The soil shall be compacted and density tests shall be performed to ensure that the designed denisities are obtained. A qualified representative of the design engineer shall be present on the site each working day during construction of a rolled dam or during the shaping and strengthening of a cast dam to ensure that materials and construction methods meet all specifications of the design. The Department of Environmental Regulation Regional Engineer shall be advised of the date on which construction or shaping of a new dam will begin so that he can inspect the site.

(b) Tailings may be deposited hydraulically on the upstream slopes of existing dams provided that the elevation of the discharge water is never higher than five feet below the adjacent crest of the dam. If water is impounded above natural ground level, tailings may be deposited on the downstream portion of a dam by either of the following procedures:

(i) If the tailings are dewatered to not less than 50% solids by weight at the discharge point, the tailings may be deposited continuously.

(ii) If the discharge point is at or beyond the point at which the toe meets the foundation, or the discharge point is at least seventy-five (75) feet from the point at which water meets the dam, the tailings may be deposited continuously by hydraulic methods.

(c) Areas around any water level control structure pipe, any other conduit, or any surface of discontinuity between materials within the mass of the dam shall be carefully installed to avoid potential concentration of seepages. All conduits through dams shall have two or more seepage collars spaced in accordance with good engineering practices pertinent to the material used for the fill. Two collars will be installed within the core when there is a core within a dam. All pipes and joints in pipes extending through a dam shall be made leakproof and shall be constructed of materials suitable for the fluids carried and the load imposed. In order to avoid leaks associated with differential settlement, conduits through dams shall not be rigidly supported by piles or piers. Backfill around conduits shall be of a density that is equal to or greater than those of the surrounding embankment. Particular attention shall be devoted to the lower third of the conduit.

(6) Documentation

(a) The owner of an earthen dam shall maintain in a permanent file the following construction records pertaining to said dam. He shall furnish a similar file within 30 days after completion of the dam to the Department of Environmental Regulation Regional Engineer for future reference should it be needed.

(i) Aerial photo of construction site after mining in the immediate area has been terminated and before shaping of the final dam.

(ii) Design drawings and calculations.

(iii) Design specifications.

(iv) Results of all soil tests on foundations and fill materials.

(v) Logs of borings and engineering geology reports.

(vi) Certified copies of construction progress inspections pertinent to core trench, toe drain, internal drains, and other significant phases of the structure. Photographs of various structural items may be included in the file.

(vii) Aerial photo of completed dam taken within 30 days after construction is completed, weather permitting.

(viii) Description of and justification for all deviations or variances from the design plans or specifications.

Specific Authority 403.061(25) FS. Law Implemented 403.061(25) FS. History—Revised 12-8-72.

17-9.04 Operational requirements.

(1) Active dams — The water level in a settling area shall not be raised or lowered more than (1) foot during any twenty-four (24) hour period, except under emergency conditions. The water level shall not be lowered more than five (5) feet per month. Each

active settling area shall be inspected as prescribed in Section 17-9.05(2). Vegetative cover adequate to inhibit wind and water erosion shall be established and maintained on all exposed surfaces of the dam. Such vegetation shall be maintained sufficiently low to permit visual inspection of the soil surfaces in critical areas outlined in Section 17-9.05.

(2) Retired dams — The vegetative cover on retired dams shall be maintained sufficiently low to permit visual inspection of the soil surfaces in critical areas outlined in Section 17-9.05. In addition, the water level control structures in retired dams shall be adjusted to suit the circumstances of storm drainage requirements as the solids concentrations of the impounded liquids becomes progressively higher. Pools of trapped storm water and/or clarified wastewater shall be drained away from the upstream face of the dam to the greatest extent possible. A dam shall not be considered as retired so long as pools of free water remain in contact with the dam.

Specific Authority 403.061(25) FS. Law Implemented 403.061(25) FS. History—Revised 12-8-72.

17-9.05 Inspections. Personnel or agents of the Department of Environmental Regulation may accompany inspectors on any routine inspection required by this rule, or inspect settling areas at any other time which is reasonable under the circumstances involved. They may also examine any routine inspection reports and be furnished copies thereof upon request.

(1) A completed new dam shall be throughly inspected prior to the deposition of industrial wastes above ground level behind it. Toe drains, spillways and water level control structures shall be certified by the design engineer as meeting all specifications of the design, and degree of compaction of the fill shall also be certified. Legible photographs, either aerial or ground, may be used to document this initial inspection, but shall not in themselves constitute certification. A complete file describing the items inspected and their condition shall be maintained by the owner, and a copy shall be furnished to the Department of Environmental Regulation Regional Engineer.

(2) Active dams shall be inspected weekly unless a defect has been disclosed, in which event the defective area of the dam shall be inspected daily until corrective maintenance has cured such defect. Inspections shall be made by competent employees of the owner of the dam who have been instructed and tested by a qualified engineer regarding items to be checked. The findings on each inspection shall be recorded, signed by the inspector, and filed after any necessary corrective action is initiated by supervisory personnel. The inspector shall travel on foot, horseback, or wheeled vehicle suitable for traversing the terrain involved at slow speeds. Items to be noted on weekly (or daily) inspections shall include, but not limited to:

(a) Condition of vegetation on dam and in area for fifty feet (50′) downstream from the outside toe.

(b) Piezometric levels within the mass of the dam when instrumentation has been installed.

(c) Condition of soil surfaces on top and slopes of the dam and in area for fifty feet (50′) downstream from the outside toe.

(d) Condition of drainage ditches in the area of the base of the dam.

(e) Liquid surface elevation and amount of freeboard. (This is to be recorded daily when limitations could be violated during a week of operations.)

(f) Condition of spillways and water level control structures, including all conduits exiting the dams.

(3) Retired dams shall be inspected monthly by a competent employee of the owner of the dam who has been instructed and tested by a qualified engineer regarding items to be checked. The findings on each inspection shall be recorded, signed by the inspector, and filed after any necessary corrective action is initiated by supervisory personnel. Such inspection shall include, but not limited to:

(a) Condition of soil surfaces on the crest, slopes, and area fifty feet (50′) downstream from the dam.

(b) Determination of piezometric levels within the mass of the dam while instrumentation of the dam has been determined to be necessary by an engineer.

(c) Determination of seepage characteristic through analyses of infra-red aerial photographs or thermal imagery when surveillance by such means has been proposed by the owner if the dam and approved by the Department of Environmental Regulation Regional Engineer.

(d) Condition of Spillway and water level control structures, including all conduits exiting the dam, and any wooden structures which are subject to rotting.

(4) When a condition as listed in Section 17-9.05(7) is found during a weekly or monthly inspection, the inspector shall ensure that a competent technical representative of the dam owner is made aware of the condition immediately. A report of the condition and the actions proposed for its correction shall be made to the Department of Environmental Regulation Regional Engineer at the earliest practicable time. The Regional Engineer may confirm correction of the condition at an appropriate time.

(5) Each active and each retired dam shall be inspected annually by an engineer registered in Florida who is experienced in the field of construction and maintenance of dams. Costs for such inspections shall be borne by owners of the dams. One copy of the report pertaining to such annual inspections shall be furnished to the Department of Environmental Regulation Regional Engineer, and the original of the report shall be retained by the owner. These inspections shall include, but not be limited to:

(a) Analyses of seepage or other significant items shown on all aerial photographs of the dam which have been taken for any reason since the date of last annual inspection.

(b) Condition of soil surfaces on top and slopes of the dam and in areas for fifty feet (50′) downstream from the outside toe.

(c) Review of all weekly, daily and monthly inspection reports to elevate the effectiveness of maintenance which was done to the dam during the period since the last annual inspection.

(d) Examination and interpretation of data obtained from any instrumentation installed in the mass of the dam.

(e) Conditon of spillway and water level control structures, including all conduits exiting the dam and any wooden structures which are subject to rotting.

(6) A retired dam which is to be abandoned shall be inspected by an engineer registered in Florida who is competent to determine that no further impoundment is being accomplished by the dam involved and that no further surveillance or maintenance is required. A copy of the final inspection used by the engineer for making his determination as above shall be furnished to the Department of Environmental Regulation Regional Engineer, and a copy shall be retained by the owner of the dam. Costs for such terminal inspections shall be borne by the owners of the dams which are to be abandoned.

(7) Any of the following items shall be considered as indicating a critical condition which requires immediate investigation and may require emergency maintenance action:

(a) Seepage on outer face or downstream from the toe in which there are boils, sand cones or deltas.

(b) Silt accumulations, boils, deltas, or cones in the drainage ditches at dam bases.

(c) Cracking of soil surface on crest or either face of the dam.

(d) Bulging of the downstream face of the dam.

(e) Seepage, damp area, or boils in vicinity of or erosion around a conduit through the dam.

(f) Any subsidence of the crest or faces.

(8) The following items shall be considered as indicating potential trouble areas which should be closely checked on subsequent inspections.

(a) Overgrowth patches of vegetation on downstream face or close area downstream from the toe.

(b) Surface erosion, gullying, or wave erosion of the upstream face of the dam.

(c) Surface erosion, gullying or damp areas on the downstream face of the dam, including the berm and the area downstream from the outside toe.

(d) Erosion below any conduit exiting the dam.

(e) Wet areas or soggy soil in downstream face of dam or in natural soil below dam.

(9) In the event of a dam failure which permits deleterious substances to enter waters controlled by the State or to cause other damages, the chairman of the Environmental Regulation Commission may convene at once a special panel of experts with experience in design and construction of earthen dams from government, industry, private engineering firms and/or educational institutions to gather data and to investigate the cause of the failure and to make recommendations for corrective actions. The owner of a failed dam shall take immediate action to arrest the flow of deleterious material when such is possible, and shall have the failed area of the dam photographed at the earliest practicable time. If feasible, the owner shall construct a coffer dam upstream from the failed area to impound materials. This will preserve the area of failure for detailed investigation, and thus contribute to factual data to be used in future safety considerations.

Specific Authority 403.061(25) FS. Law Implemented 403.061(25) FS. History—Revised 12-8-72.

(d) Examination and interpretation of data obtained from any instrumentation installed in the mass of the dam.

(e) Conditon of spillway and water level control structures, including all conduits exiting the dam and any wooden structures which are subject to rotting.

(6) A retired dam which is to be abandoned shall be inspected by an engineer registered in Florida who is competent to determine that no further impoundment is being accomplished by the dam involved and that no further surveillance or maintenance is required. A copy of the final inspection used by the engineer for making his determination as above shall be furnished to the Department of Environmental Regulation Regional Engineer, and a copy shall be retained by the owner of the dam. Costs for such terminal inspections shall be borne by the owners of the dams which are to be abandoned.

(7) Any of the following items shall be considered as indicating a critical condition which requires immediate investigation and may require emergency maintenance action:

(a) Seepage on outer face or downstream from the toe in which there are boils, sand cones or deltas.

(b) Silt accumulations, boils, deltas, or cones in the drainage ditches at dam bases.

(c) Cracking of soil surface on crest or either face of the dam.

(d) Bulging of the downstream face of the dam.

(e) Seepage, damp area, or boils in vicinity of or erosion around a conduit through the dam.

(f) Any subsidence of the crest or faces.

(8) The following items shall be considered as indicating potential trouble areas which should be closely checked on subsequent inspections.

(a) Overgrowth patches of vegetation on downstream face or close area downstream from the toe.

(b) Surface erosion, gullying, or wave erosion of the upstream face of the dam.

(c) Surface erosion, gullying or damp areas on the downstream face of the dam, including the berm and the area downstream from the outside toe.

(d) Erosion below any conduit exiting the dam.

(e) Wet areas or soggy soil in downstream face of dam or in natural soil below dam.

(9) In the event of a dam failure which permits deleterious substances to enter waters controlled by the State or to cause other damages, the chairman of the Environmental Regulation Commission may convene at once a special panel of experts with experience in design and construction of earthen dams from government, industry, private engineering firms and/or educational institutions to gather data and to investigate the cause of the failure and to make recommendations for corrective actions. The owner of a failed dam shall take immediate action to arrest the flow of deleterious material when such is possible, and shall have the failed area of the dam photographed at the earliest practicable time. If feasible, the owner shall construct a coffer dam upstream from the failed area to impound materials. This will preserve the area of failure for detailed investigation, and thus contribute to factual data to be used in future safety considerations.

Specific Authority 403.061(25) FS. Law Implemented 403.061(25) FS. History—Revised 12-8-72.

APPENDIX 8

U.S. Geological Survey

Streamflow Station Summaries

GAGING STATION RECORDS

ALTAMAHA-ST. MARYS RIVERS

ST. MARYS RIVER BASIN

02228500 NORTH PRONG ST. MARYS RIVER AT MONIAC, GA

LOCATION.--Lat 30°31'03", long 82°13'50", in NW¼ sec.8, T.1 N., R.21 E., Baker County, Fla., Hydrologic Unit 03070204, near right bank at upstream side of bridge on State Highways 2 and 94, 0.2 mi (0.3 km) upstream from Georgia Southern & Florida Railway bridge, 0.4 mi (0.6 km) west of Moniac, 1.0 mi (1.6 km) downstream from Moccasin Creek, and 122 mi (196 km) upstream from mouth of St. Marys River.

DRAINAGE AREA.--160 mi^2 (410 km^2), approximately, includes part of watershed in Okefenokee Swamp which is indeterminate.

PERIOD OF RECORD.--January 1921 to December 1923 (published as St. Marys River at Moniac), January 1927 to June 1930, July 1932 to June 1934, October 1950 to current year.

REVISED RECORDS.--WSP 1234: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 89.40 ft (27.249 m) above mean sea level. January 1921 to June 1934, nonrecording gage at site 800 ft (240 m) downstream at datum 3.22 ft (0.981 m) higher.

REMARKS.--Records good.

AVERAGE DISCHARGE.--32 years (water years 1922-23, 1928-29, 1933, 1951-77), 164 ft^3/s (4.644 m^3/s), 13.92 in/yr (354 mm/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 11,600 ft^3/s (329 m^3/s) Apr. 5, 1973, gage height, 22.98 ft (7.004 m); no flow for many days in some years; minimum gage height, 3.62 ft (1.103 m) June 26, 1955.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,340 ft^3/s (37.9 m^3/s) Aug. 22, gage height, 12.77 ft (3.892 m); no flow May 20-24, June 16; minimum gage height, 4.22 ft (1.286 m) May 22, 23.

ALTAMAHA-ST. MARYS RIVER

ST. MARYS RIVER BASIN

02228700 OCEAN POND AT OLUSTEE, FL

LOCATION.--Lat 30°12'55", long 82°26'31", in SW¼ sec.20, T.3 S., R. 19 E., Baker County, Hydrologic Unit 03070204, on south shore on private dock, 1.2 mi (1.9 km) northwest of Olustee and 11.3 mi (18.2 km) east of Lake City.

SURFACE AREA.--1,793 acres, 2.8 mi^2 (7.26 km^2).

DRAINAGE AREA.--13.1 mi^2 (33.9 km^2).

PERIOD OF RECORD.--December 1974 to March 1975, July 1975 to December 1976, January 1977 to September 1977 (weekly).

GAGE.--Nonrecording gage. Datum of gage is 150.40 ft (45.482 m) above mean sea level. Gage readings have been reduced to elevations above mean sea level.

REMARKS.--Some diversionary flow to the Suwannee River Basin at times.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily elevation, 155.80 ft (47.488 m) July 12, 1975; minimum daily, 153.76 ft (46.866 m) July 28, Aug. 18, 1977.

EXTREMES FOR CURRENT YEAR.--Maximum daily elevation, 155.56 ft (47.415 m) Feb. 9; minimum daily, 153.76 ft (46.866 m) July 28, Aug. 18, 1977.

GAGING STATION RECORDS

ALTAMAHA-ST MARYS RIVERS

ST MARYS RIVER BASIN

02229000 MIDDLE PRONG ST. MARYS RIVER AT TAYLOR, FL

LOCATION.--Lat 30°26'10", long 82°17'15", in SW¼ sec.2, T.1 S., R.20 E., Baker County, Hydrologic Unit 03070204, near center of span on State Highway 125, 0.5 mi (0.8 km) southeast of Taylor, 0.9 mi (1.5 km) upstream from Little River, and 7.4 mi (11.9 km) upstream from mouth.

DRAINAGE AREA.--125 mi^2 (324 km^2), approximately.

PERIOD OF RECORD.--September 1955 to September 1967, April 1976 to current year.

GAGE.--Water-stage recorder. Datum of gage is 89.51 ft (27.283 m) above mean sea level (Florida Department of Transportation bench mark). Prior to April 1976 at same site at datum 0.11 ft (0.034 m) lower.

REMARKS.--Records fair. The figure of drainage area published in WSP 1905, 2105, WRD FLA. 1966-67, was grossly in error.

AVERAGE DISCHARGE.--13 years (1955-67, 1977), 110 ft^3/s (3.115 m^3/s).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 3,920 ft^3/s (111 m^3/s) Sept. 12, 1964, gage height, 14.49 ft (4.383 m), present datum; minimum discharge, 0.50 ft^3/s (0.014 m^3/s) July 21-26; minimum gage height, 0.96 ft (0.293 m), present daum, Sept. 27, 1963, July 21-26, 1977.

EXTREMES FOR CURRENT YEAR.--Peak discharges above base of 450 ft^3/s (12.7 m^3/s) and maximum (*):

Date	Time	Discharge (ft^3/s)	(m^3/s)	Gage height (ft)	(m)	Date	Time	Discharge (ft^3/s)	(m^3/s)	Gage height (ft)	(m)
Sept. 6	0700	548	15.5	8.99	2.740	Sept. 22	1700	*1,030	29.2	*10.37	3.161

Minimum discharge, 0.50 ft^3/s (0.014 m^3/s) July 21-26, minimum gage height, 0.96 ft (0.293 m).

ALTAMAHA - ST. MARYS RIVER

ST. MARYS RIVER BASIN

02231000 ST. MARYS RIVER NEAR MACCLENNY, FL
(National Stream-Quality Accounting Network Station)

LOCATION.--Lat 30°21'31", long 82°04'54", in NW¼ sec.2, T.2 S., R.22 E., Baker County, Hydrologic Unit 03070204, at gaging station on right bank 200 ft (60 m) downstream from site of former Stokes Bridge, 1 mi (2 km) downstream from confluence of North and South Prongs, 6 mi (10 km) northeast of MacClenny, and 100 mi (161 km) upstream from mouth.

DRAINAGE AREA.--700 mi^2 (1,800 km^2) approximately, includes part of water shed in Okefenokee Swamp, which is indeterminate.

PERIOD OF RECORD.--Water years 1965 to current year.

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: March 1965 to October 1969, January 1974 to current year.
WATER TEMPERATURE: March 1965 to October 1969, January 1974 to September 1976.

REMARKS.--Observer temperature data questionable, deleted for 1976 water year.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: Maximum daily, 204 micromhos Mar. 31, 1974; minimum daily, 25 micromhos Jan. 7, 1975.
WATER TEMPERATURES: Maximum daily, 31.0°C July 28, 1966, several days during Aug. and Sept. 1976; minimum daily, 6.0°C Jan. 21, 1966, Jan. 17, 19-21, 1968.

EXTREMES FOR CURRENT YEAR.--
SPECIFIC CONDUCTANCE: Maximum daily, 160 micromhos Feb. 12; minimum daily, 37 micromhos several days.

ALTAMAHA-ST. MARYS RIVERS

ST. MARYS RIVER BASIN

02231000 ST. MARYS RIVER NEAR MACCLENNY, FL

LOCATION.--Lat 30°21'31", long 82°04'54", in NW¼ sec.2, T.2 S., R.22 E., Baker County, Hydrologic Unit 03070204, on right bank 200 ft (60 m) downstream from site of former Stokes Bridge, 1 mi (2 km) downstream from confluence of North and South Prongs, 6 mi (10 km) northeast of Macclenny, and 100 mi (161 km) upstream from mouth.

DRAINAGE AREA.--700 mi^2 (1,800 km^2), approximately, includes part of watershed in Okefenokee Swamp which is indeterminate.

PERIOD OF RECORD.--October 1926 to current year.

REVISED RECORDS.--WSP 1082: 1928(M), 1945(M). WSP 1142: 1928, 1945. WSP 1434: 1927. WSP 1905: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 40.00 ft (12.192 m) above mean sea level (levels by Mees and Mees). Prior to Feb. 21, 1939, nonrecording gage and Feb. 21, 1939, to Aug. 15, 1948, water-stage recorder, at site of former bridge 200 ft (60 m) upstream at same datum.

REMARKS.--Records good.

AVERAGE DISCHARGE.--51 years, 681 ft^3/s (19.29 m^3/s), 13.21 in/yr (336 mm/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 28,100 ft^3/s (796 m^3/s) Sept. 25, 1947; maximum gage height, 23.25 ft (7.087 m) Sept. 13, 1964, from floodmark; minimum discharge observed, 12 ft^3/s (0.34 m^3/s) May 22, 1932; minimum gage height observed, 0.04 ft (0.012 m) June 4, 5, 1927.

EXTREMES FOR CURRENT YEAR.--Peak discharges above base of 2,000 ft^3/s (56.6 m^3/s) and maximum (*):

Date	Time	Discharge (ft^3/s)	Discharge (m^3/s)	Gage height (ft)	Gage height (m)
Jan. 6	0300	2,360	66.8	11.92	3.633
Feb. 6	0500	2,650	75.0	12.42	3.786
Aug. 27	1200	2,510	71.1	12.19	3.716
Sept. 7	1200	3,290	93.2	13.27	4.045
Sept. 24	1600	*3,350	94.9	13.33	4.063

Minimum discharge, 24 ft^3/s (0.68 m^3/s) July 26, 27; minimum gage height, 1.15 ft (0.351 m) July 27.

SUWANNEE AND AUCILLA RIVERS

SUWANNEE RIVER BASIN ABOVE WITHLACOOCHEE RIVER EXCLUDING ALAPAHA RIVER BASIN

02314986 ROCKY CREEK NEAR BELMONT, FL

LOCATION.--Lat 30°32'40", long 82°44'02", in SE¼ sec.29, T.2 N., R.16 E., Hamilton County, Hydrologic Unit 03110201, at bridge on county road, 1.4 mi (2.3 km) upstream from mouth, 3.0 mi (4.8 km) north of Belmont, and 12 mi (19 km) east of Bakers Mill.

DRAINAGE AREA.--50 mi^2 (130 km^2), approximately.

PERIOD OF RECORD.--August 1970 to April 1976, (gage heights and discharge measurements only); May 1976 to current year.

REVISED RECORDS.--WDR FL-75-1: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 86.64 ft (26.408 m) above mean sea level. Prior to May 19, 1976, nonrecording gage at same site and datum.

REMARKS.--Records poor. Flow affected by backwater from Suwannee River. Indefinite stage-discharge relation, Nov. 30 to Jan. 30.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge measured, 2,410 ft^3/s (68.3 m^3/s) Apr. 6, 1973, gage height, 12.25 ft (3.734 m); maximum gage height, 12.50 ft (3.810 m) Dec. 17, 1976, (backwater from Suwannee River); no flow many days during years 1976-77; minimum gage height 1.28 ft (0.390 m) July 15, 1977.

EXTREMES FOR CURRENT YEAR.--Maximum discharge 350 ft^3/s (9.91 m^3/s) Dec. 15, gage height, 12.25 ft (3.734 m); no flow many days; minimum gage height, 1.28 ft (0.390 m) July 15.

SUWANNEE AND AUCILLA RIVERS

SUWANNEE RIVER BASIN ABOVE WITHLACOOCHEE RIVER EXCLUDING ALAPAHA RIVER BASIN

02315000 SUWANNEE RIVER NEAR BENTON, FL

LOCATION.--Lat 30°30'26", long 82°42'59", in NE¼ sec.9, T.1 N., R.16 E., Columbia County, Hydrologic Unit 03110201, near center of channel on downstream side of bridge on State Highway 6, 3.7 mi (6.0 km) northwest of Benton, 6.4 mi (10.3 km) south of Fla.-Ga. State line, 13.7 mi (22.0 km) east of Jasper, and 196 mi (315 km), upstream from mouth.

DRAINAGE AREA.--2,090 mi^2 (5,413 km^2), approximately, includes part of watershed in Okefenokee Swamp which is indeterminate.

PERIOD OF RECORD.--October 1975 to current year. Miscellaneous discharge measurements for some periods July 1934 to September 1975. Records for December 1931 to June 1934, at site 2.0 mi (3.2 km) upstream (at Turner bridge) not equivalent owing to difference in drainage areas.

GAGE.--Nonrecording gage. Datum of gage is at mean sea level. Dec. 8, 1931 to June 30, 1934, nonrecording gage at site 2.0 mi (3.2 km) upstream at datum unknown.

REMARKS.--Records good except those for periods of no gage-height record, Oct. 1 to Nov. 3, which are fair.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 10,500 ft^3/s (297 m^3/s) Dec. 16, 17, 1976, maximum gage height, 97.28 ft (29.650 m) Dec. 17, 1976; minimum, 5.0 ft^3/s (0.142 m^3/s) Aug. 9, 1977, gage height, 74.20 ft (26.616 m).

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum discharge measured, 27,700 ft^3/s (784 m^3/s) Apr. 6, 1973; gage height, 102.80 ft (31.333 m).

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 10,500 ft^3/s (297 m^3/s) Dec. 16, 17, ; maximum gage height, 97.28 ft (29,650 m) Dec. 17; minimum, 5.0 ft^3/s (0.142 m^3/s) Aug. 9, gage height, 74.20 ft (22.616 m).

SUWANNEE AND AUCILLA RIVERS

SUWANNEE RIVER BASIN ABOVE WITHLACOOCHEE RIVER EXCLUDING ALAPAHA RIVER BASIN

02315005 HUNTER CREEK NEAR BELMONT, FL

LOCATION.--Lat 30°29'08", long 82°42'44", in SE¼ sec.16, T.1 N., R.16 E., Hamilton County, Hydrologic Unit 03110201, at bridge on State Highway 135, 0.8 mi (1.3 km) upstream from mouth, 1.6 mi (2.6 km) southeast of Belmont, and 12 mi (19 km) east of Bakers Mill.

DRAINAGE.--25.4 mi^2 (65.8 km^2).

PERIOD OF RECORD.--Discharge measurements: 1970 (one discharge measurement); August 1971 to current year (gage heights and discharge measurements only).
Temperature observations: October 1975 to current year. Results of miscellaneous temperature observations prior to October 1975 are available in files of Geological Survey.

REVISED RECORDS.--WDR FL-75-1: Drainage area.

GAGE.--Nonrecording. Altitude of gage is 100 ft (30.48 m) from topographic map.

REMARKS.--Possible interchange of water between Hunter Creek, Swift Creek, and Roaring Creek basins due to release from diked phoshpate mining area encompassing parts of the three basins. Flow may contain some ground water used for phosphate mining.

EXTREMES FOR PERIOD OF RECORD.--Discharge (1970-77): Maximum discharge measured, 425 ft^3/s (12.0 m^3/s) June 26, 1972; minimum measured, 1.0 ft^3/s (0.028 m^3/s) June 6, 1977.
Water temperature (1975-77): Maximum temperature observed, 28,0°C Aug. 1, 1977, minimum observed, 7.5°C Jan. 31, 1977.

SUWANNEE AND AUCILLA RIVERS

SUWANNEE RIVER BASIN ABOVE WITHLACOOCHEE RIVER EXCLUDING ALAPAHA RIVER BASIN

02315200 DEEP CREEK NEAR SUWANNEE VALLEY, FL

LOCATION.--Lat 30°21'55", long 82°37'13", in NW¼ sec.33, T.1 S., R.17 E., Columbia County, Hydrologic Unit 03110201, near left bank on upstream side of bridge on U.S. Highway 441, 4.0 mi (6.4 km) upstream from mouth, 7.0 mi (11.3 km) east of Suwannee Valley, and 12.5 mi (20.1 km) north of Lake City.

DRAINAGE AREA.--88.6 mi^2 (229.5 km^2).

PERIOD OF RECORD.--April 1976 to current year. Miscellaneous discharge measurements for some periods prior to April 1976.

GAGE.--Water-stage recorder. Datum of gage is 82.56 ft (25.164 m) above mean sea level (levels by L. L. Lee and Associates).

REMARKS.--Records fair.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 675 ft^3/s (19.1 m^3/s) Feb. 4, 1977, gage height, 10.40 ft (3.170 m); minimum, 0.19 ft^3/s (0.005 m^3/s) May 25, 1977, gage height, 2.08 ft (0.634 m).

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 675 ft^3/s (19.1 m^3/s) Feb. 4, gage height, 10.40 ft (3.170 m); minimum, 0.19 ft^3/s (0.005 m^3/s) May 25, gage height, 2.08 ft (0.634 m).

SUWANNEE AND AUCILLA RIVERS

SUWANNEE RIVER BASIN ABOVE WITHLACOOCHEE RIVER EXCLUDING ALAPAHA RIVER BASIN

02315392 ROBINSON CREEK NEAR SUWANNEE VALLEY, FL

LOCATION.--30°18'56", long 82°38'41", in NE¼ sec.18, T.2 S., R.17 E., Columbia County, Hydrologic Unit 03110201, near center of span on downstream side of bridge on State Highway 246, 3.4 mi (5.5 km) upstream from mouth, 4.0 mi (6.4 km) northeast of Suwannee Valley and 8.7 mi (14.0 km) north of Lake City.

DRAINAGE AREA.--27.4 mi^2 (71.0 km^2).

PERIOD OF RECORD.--April 1976 to current year.

GAGE.--Water-stage recorder. Datum of gage is 93.54 ft (28.511 m) above mean sea level(levels by L. L. Lee and Associate from, Florida Department of Transportation benchmark, elevations by U.S. Geological Survey). Prior to Apr. 8, 1976, nonrecording gage at site 0.3 mi (0.5 km) upstream, at datum unknown.

REMARKS.--Records poor.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 330 cfs (9.34 m^3/s) Feb. 4, 1977, gage height, 6.72 ft (2.048 m); no flow many days during 1977; minimum gage height, 0.68 ft (0.207 m) Aug. 24.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 330 cfs (9.34 m^3/s) Feb. 4, gage height, 6.72 ft (2.048 m); no flow many days; minimum gage height, 0.81 ft (0.247 m) Sept. 17.

SUWANNEE AND AUCILLA RIVERS

SUWANNEE RIVER BASIN ABOVE WITHLACOOCHEE RIVER EXCLUDING ALAPAHA RIVER BASIN

02315500 SUWANNEE RIVER AT WHITE SPRINGS, FL.

LOCATION.--Lat 30°19'32", long 82°44'18", in SW¼ sec.8, T.2 S., R.16 E., Columbia County, Hydrologic Unit 03110201, on left bank at downstream side of bridge on U.S. Highway 41, 1.0 mi (1.6 km) southeast of White Springs and 171 mi (275 km) upstream from mouth.

DRAINAGE AREA.--2,430 mi^2 (6,290 km^2) approximately, includes part of watershed in Okefenokee Swamp which is indeterminate.

PERIOD OF RECORD.--May 1906 to December 1908, February 1927 to current year.

REVISED RECORDS.--WSP 1504: 1906, 1908. WSP 1905; WDR FL-75: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 48.54 ft (14.795 m) above mean sea level (Corps of Engineers bench mark). Prior to July 31, 1932, nonrecording gage at site 1.0 mi (1.6 km) downstream at same datum.

REMARKS.--Records good.

AVERAGE DISCHARGE.--52 years, 1,879 ft^3/s (53.21 m^3/s), 10.50 in/yr (267 mm/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 38,100 ft^3/s (1,080 m^3/s) Apr. 10, 1973, gage height, 40.02 ft (12.198 m); minimum, 4.8 ft^3/s (0.14 m^3/s) Nov. 15, 1931; minimum gage height, 1.05 ft (0.320 m) June 24-26, 1955.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 10,600 ft^3/s (300 m^3/s) Dec. 20, gage height, 28.47 (8.678 m); minimum, 17 ft^3/s (0.48 m^3/s) Aug. 9, gage height, 1.14 ft (0.347 m).

SUWANNEE AND AUCILLA RIVERS

SUWANNEE RIVER BASIN ABOVE WITHLACOOCHEE RIVER EXCLUDING ALAPAHA RIVER BASIN

02315520 SWIFT CREEK AT FACIL, FL

LOCATION.--Lat 30°22'14", long 82°48'00", in SE¼ sec.27, T.1 S., R.15 E., Hamilton County, Hydrologic Unit 03110201, near right bank on downstream side of bridge on U.S. Highway 41, 0.5 mi (0.8 km) northwest of Facil, 2.8 mi (4.5 km) upstream from mouth, and 3.0 mi (4.8 km) southeast of Genoa.

DRAINAGE AREA.--65.3 mi^2 (169.1 km^2).

PERIOD OF RECORD.--August 1969 to April 1976 (gage heights and discharge measurements only); May 1976 to current year.

REVISED RECORDS.--WDR FL-75-1: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 86.43 ft (26.344 m) above mean sea level. Prior to May 20, 1976, nonrecording gage at same site and datum.

REMARKS.--Records fair. Since about 1965 flow partly regulated by control sturctures on main channel, Altmans Bay canal, and unamed tributary. Possible interchange of water between Swift Creek, Hunter Creek, and Roaring Creek basins due to releases from diked phosphate mining area encompassing parts of the three basins. Flow may contain some ground water used for phosphate mining.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge measured, 1,180 ft^3/s (33.4 m^3/s) June 27, 1972, gage height, 8.54 ft (2.603 m) observed; minimum discharge, 1.6 ft^3/s (0.045 m^3/s) Nov. 12, 1977; minimum gage height, 0.44 ft (0.134 m) May 12,13, 1977.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 325 ft^3/s (9.20 m^3/s) Jan. 4,5, gage height, 5.23 ft (1.594 m); minimum, 1.6 ft^3/s (0.045 m^3/s) Nov. 12, minimum gage height, 0.44 (0.134 m), May 12,13.

SUWANNEE AND AUCILLA RIVERS

SUWANNEE RIVER BASIN ABOVE WITHLACOOCHEE RIVER

02315550 SUWANNEE RIVER AT SUWANNEE SPRINGS, FL

LOCATION.--Lat 30°23'34", long 82°56'00", in NE¼ sec.20, T.1 S., R.14 E., Suwannee County, Hydrologic Unit 03110201, on left bank at town of Suwannee Springs, 0.2 mi (0.3 km) upstream from Suwannee Springs, 0.5 mi (0.8 km) upstream from bridge on U.S. Highway 129, 7.5 mi (12.1 km) north of Live Oak, and 150 mi (241 km) upstream from mouth.

DRAINAGE AREA.--2,630 mi^2 (6,810 km^2), approximately, includes part of watershed in Okefenokee Swamp which is indeterminate.

PERIOD OF RECORD.--October 1974 to September 1975. Prior to November 1960, six miscellaneous discharge measurements made in 1906, 1951 and 1956. November 1960 to September 1974 (gage heights and discharge measurements only); gage heights published since October 1962.

REVISED RECORDS.--WSP 2105: WDR FL-75-1: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is at mean sea level (Florida Department of Transportation bench mark). Dec. 13, 1960 to Apr. 26, 1972 and since Aug. 21, 1974, auxiliary nonrecording gage 0.3 mi (0.5 km) downstream from base gage at same datum.

REMARKS.--Records good. From Jan. 19, 1963 to Oct. 29, 1968, H-pile dam with removable boards located approximately 500 ft (150 m) downstream from base gage, the rise of Mar. 6, 1963 caused a washout at right end of dam.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 30,100 ft^3/s (852 m^3/s) Apr. 12, 1973, gage height, 78.91 ft (24.052 m), from floodmarks; minimum, 101 ft^3/s (2.86 m^3/s) Aug. 7,8,9, 1977; minimum gage height, 37.00 ft (11.278 m) estimated, Nov. 2,3, 1968.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 10,100 ft^3/s (286 m^3/s) Dec. 20, gage height, 63.77 ft (19.437 m); minimum, 101 ft^3/s (2.86 m^3/s) Aug. 7,8,9, gage height, 37.96 ft (11.570 m).

SUWANNEE AND AUCILLA RIVERS

WITHLACOOCHEE RIVER BASIN

02319000 WITHLACOOCHEE RIVER NEAR PINETTA, FL

LOCATION.--Lat 30°35'43", long 83°15'35", in NW¼ sec.7, T.2 N., R.11 E., Madison County, Hydrologic Unit 03110203, on right bank 30 ft (9 m) downstream from bridge, 0.1 mi (0.2 km) downstream from small tributary, 0.3 mi (0.5 km) west of Bellville, 5.6 mi (90 km) east of Pinetta, and 22 (35 km) upstream from mouth.

DRAINAGE AREA.--2,120 mi^2 (5,490 km^2), approximately.

PERIOD OF RECORD.--October 1931 to current year. Monthly discharge only for October and November 1931, published in WSP 1304.

REVISED RECORDS.--WSP 972: 1941-42. WSP 1905: Drainage area.

GAGE.--Nonrecording gage. Datum of gage is 47.21 ft (14.390 m) above mean sea level (levels by Corps of Engineers). Oct. 11, 1931 to Dec. 3, 1941, nonrecording gage at same site and datum. Dec. 3, 1941 to Aug. 2, 1972, water-stage recorder at same site and datum.

REMARKS.--Records good above 500 ft^3/s (14.2 m^3/s) and fair below.

AVERAGE DISCHARGE.--46 years, 1,674 ft^3/s (47.41 m^3/s), 10.72 in/yr (272 mm/yr). The figure published in the 1976 report was in error; the correct figure is, 45 years, 1,660 ft^3/s (47.01 m^3/s).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 79,400 ft^3/s (2,250 m^3/s) Apr. 5, 1948, gage height, 38.64 ft (11.777 m), from floodmarks; minimum, 70 ft^3/s (1.98 m^3/s) Aug. 23, 1955, gage height, 6.27 ft (1.911 m).

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in August 1928 reached a stage of 36.75 ft (11.201 m) from floodmarks, discharge, 53,600 ft^3/s (1,520 m^3/s).

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 12,400 ft^3/s (351 m^3/s) Mar. 17, gage height, 25.60 ft (7.802 m); minimum, 155 ft^3/s (4.39 m^3/s) July 26,27, gage height, 6.66 ft (2.030 m).

SUWANNEE AND AUCILLA RIVERS

SUWANNEE RIVER BASIN BELOW WITHLACOOCHEE RIVER EXCLUDING SANTA FE RIVER BASIN

02319500 SUWANNEE RIVER AT ELLAVILLE, FL

LOCATION.--Lat 30°23'04", long 83°10'19", in NE¼ sec.24, T.1 S., R.11 E., Suwannee County, Hydrologic Unit 03110205, on left bank at Ellaville, 100 ft (30 m) upstream from Seaboard Air Line Railroad bridge, 200 ft (61 m) downstream from Withlacoochee River, 900 ft (274 m) upstream from bridge on U.S. Highway 90, and 127 mi (204 km) upstream from mouth.

DRAINAGE AREA.--6,970 mi^2 (18,052 km^2), approximately, includes part of watershed in Okefenokee Swamp which is indeterminate.

PERIOD OF RECORD.--January 1927 to current year.

REVISED RECORDS.--WSP 1905: WDR FL-75-1: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 27.22 ft (8.297 m) above mean sea level. Prior to June 20, 1932, nonrecording gage at same site and datum. Nov. 8, 1955 to Sept. 30, 1970, nonrecording gage 1.1 mi (1.8 km) downstream from base gage at datum 24.55 ft (7.483 m) above mean sea level used as supplementary gage when flow was less than 4,800 ft^3/s (136 m^3/s).

REMARKS.--Records good. Since Nov. 7, 1953, slight regulation at low water caused by diversions above control 0.7 mi (1.1 km) downstream from gage by a steam-electric powerplant for cooling of condensers. Total diverted flow is returned to river below control. Records include flow of large spring on left bank about 200 ft (61 m) downstream; spring flow may reverse during high stages.

AVERAGE DISCHARGE.--50 years, 8,176 ft^3/s (231.54 m^3/s), 12.82 in/yr (326 mm/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 95,300 ft^3/s (2,700 m^3/s) Apr. 7,8, 1948, gage height, 40.88 ft (12.460 m), from floodmarks; minimum, 882 ft^3/s (25.0 m^3/s) July 17, 1955; minimum gage height, 1.56 ft (0.475 m) Dec. 1, 1968.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 23,400 ft^3/s (663 m^3/s) Jan. 14, 15, maximum gage height, 22.47 ft (6.849 m) Jan. 14; minimum, 1,620 ft ^{3}/s (45.9 m^3/s) July 28,29,30; gage height, 2.26 ft (0.689 m).

SUWANNEE AND AUCILLA RIVERS

SUWANNEE RIVER BASIN BELOW WITHLACOOCHEE RIVER EXCLUDING SANTA FE RIVER BASIN

02320500 SUWANNEE RIVER AT BRANFORD, FL

LOCATION.--Lat 29°57'20". long 82°55'40", in NE¼ sec.20, T.6 S., R.14 E., Suwannee County, Hydrologic Unit 03110205, near left bank on upstream side of bridge on U.S. Highways 27 and 129 at Branford, 10.8 mi (17.4 km) upstream from Santa Fe River and 75 mi (121 km) upstream from mouth.

DRAINAGE AREA.--7,880 mi^2 (20,410 km^2), includes part of watershed in Okefenokee Swamp which is indeterminate.

PERIOD OF RECORD.--July 1931 to current year.

REVISED RECORDS.--WSP 1905: WDR FL-75-1: Drainage area.

GAGE.--Nonrecording gage. Datum of gage is 4.81 ft (1.466 m) above mean sea level.

REMARKS.--Records good.

AVERAGE DISCHARGE.--46 years, 6,994 ft^3/s (198.1 m^3/s) 12.05 in/yr (306 mm/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 83,900 ft^3/s (2,380 m^3/s) Apr. 11, 1948, gage height, 34.07 ft (10.385 m); minimum, 1,530 ft^3/s (43.3 m^3/s) July 1,2, 1955; minimum gage height, 1.97 ft (0.600 m) Jan. 10,11,14,17, 1956.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of August 1928 reached a stage of 32.0 ft (9.75 m) from floodmark; discharge, 65,000 ft^3/s (1,840 m^3/s) computed on basis of measured crest flow at Ellaville (station 02319600).

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 21,800 ft^3/s (617 m^3/s) Jan. 19, gage height, 22.13 ft (6.745 m); minimum, 2,610 ft^3/s (73.9 m^3/s) July 30, gage height, 4.39 ft (1.338 m).

SUWANNEE AND AUCILLA RIVERS

SANTA FE RIVER BASIN

02320700 SANTA FE RIVER NEAR GRAHAM, FL

LOCATION.--Lat 29°50'46", long 82°13'11", in NE¼ sec.32 T.7 S., R.21 E., Alachua County, Hydrologic Unit 03110206, near left bank on upstream side of bridge on State Highway 225, 1.0 mi (1.6 km) south of Graham, 1.5 mi (2.4 km) upstream from Sampson River, and 71 mi (114 km) upstream from mouth.

DRAINAGE AREA.--94.9 mi^2 (245.8 km^2).

PERIOD OF RECORD.--August 1957 to current year.

REVISED RECORDS.--WSP 2105: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 103.55 ft (31.562 m) above mean sea level.

REMARKS.--Records fair. Records do not include diversions, during periods of high stages, from Santa Fe Lake through Lochloosa Creek in St. Johns River basin.

AVERAGE DISCHARGE.--20 years, 8.48 ft^3/s (0.240 m^3/s), 8.77 in/yr (223 mm/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,360 ft^3/s (66.8 m^3/s) Sept. 12, 1964, gage height, 14.97 ft (4.563 m); minimum, 0.04 ft^3/s (0.001 m^3/s) July 25,28, 1977; minimum gage height, 3.06 ft (0.932 m) May 17, 18, 1977.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 102 ft^3/s (2.89 m^3/s) Feb. 4, gage height, 6.54 ft (1.993 m), no peak above base of 400 ft^3/s (11.3 m^3/s); minimum, 0.04 ft^3/s (0.001 m^3/s) July 25,28; minimum gage height, 3.06 ft (0.932 m) May 17,18.

SUWANNEE AND AUCILLA RIVERS

SANTA FE RIVER BASIN

02320800 SAMPSON RIVER AT SAMPSON CITY, FL

LOCATION.--Lat 29°55'07", long 82°12'39", in NW¼ sec.4, T.7 S., R.21 E., Bradford County, Hydrologic Unit 03110206, on downstream side of culvert on State Highway 225 at Sampson City, 0.4 mi (0.6 km) downstream from Lake Sampson, 6.3 mi (10.1 km) southwest of Starke, and 5.9 (9.3 km) upstream from mouth.

DRAINAGE AREA.--59.7 mi^2 (154.6 km^2).

PERIOD OF RECORD.--August 1957 to September 1960 (low-flow partial-record station); 1965, 1967 (gage heights and discharge measurements only, each water year). Prior to October 1975 published as "at Sampson"; October 1975 to May 1977 (gage heights and discharge measurements only), discontinued.
Temperature observations: October 1975 to May 1977 (discontinued). Results of miscellaneous temperature observations prior to October 1975 are available in files of the Geological Survey.

REVISED RECORDS.--WDR FL-76-4: Drainage area.

GAGE.--Nonrecording gage and crest-stage gage. Datum is 120.82 ft (36.826 m) above mean sea level, datum of 1929. Prior to April 21, 1967, nonrecording gage at same site at datum 4.96 ft (1.512 m) lower.

REMARKS.--Same regulation since April 1967 by manipulation of stoplogs on upstream side of culvert above station. Installation date unknown.

EXTREMES FOR PERIOD OF RECORD.--Discharge (1958-60, 1965, 1967, 1975-77): Maximum discharge measured, 325 ft^3/s (9.20 m^3/s) Mar. 23, 1959, gage height, 12.26 ft (3.737 m) present datum: minimum measured, 2.1 ft^3/s (0.059 m^3/s) Mar. 24, 1965; minimum gage height observed, 7.14 ft (2.176 m) Apr. 15, 1976, present datum.
Water temperatures 1975-77: Maximum temperatures observed, 28.0 °C Aug. 31, 1976; minimum observed, 10.0 °C Jan. 12 and Feb. 11,

02320815 SAMPSON RIVER NEAR GRAHAM, FL

LOCATION.--Lat 29°51'36", long 82°13'47", in NW¼ sec.29, T.7 S., R.21 E., Bradford County, Hydrologic Unit 03110206, at bridge on State Highway 18, 0.7 mi (1.1 km) west of Graham, and 1.0 mi (1.6 km) upstream from mouth.

DRAINAGE AREA.--74.3 mi^2 (192.4 km^2).

PERIOD OF RECORD.--Discharge measurements: 1958 (one discharge measurement); October 1975 to May 1977 (gage height and discharge measurements only), discontinued.
Temperature observations: 1958, October 1975 to May 1977 (discontinued). Results of miscellaneous temperature observations prior to October 1975 are available in files of Geological Survey.

GAGE.--Nonrecording gage and crest-stage gage. Altitude of gage is 110 ft (33.5 m), from topographic map.

REMARKS.--Flow slightly regulated by stoplog dam at Sampson City (02320800) 5.3 mi (8.5 km) upstream. Discharge occasionally affected by backwater from Santa Fe River at high water.

EXTREMES FOR PERIOD OF RECORD.--Discharge (1958, 1975-77): Maximum discharge measured, 189 ft^3/s (5.35 m^3/s) Oct. 15, 1975; Maximum gage height 10.36 ft (3.16 m) Feb. 3, 1977 (discharge not determined); minimum measured, 0.74 ft (0.021 m^3/s) May 25, 1977, gage height 5.72 ft (1.74 m).
Water temperatures (1975-77): Maximum temperature observed, 27.0 °C Oct. 15, 1976 and Aug. 31, 1976; minimum observed, 8.0 °C Jan. 12, 1977.

SUWANNEE AND AUCILLA RIVERS

SANTA FE RIVER BASIN

02320900 NEW RIVER NEAR RAIFORD, FL

LOCATION.--Lat 30°04'00", long 82°11'03", in NE¼ sec.15, T.5 S., R.21 E., Union County, Hydrologic Unit 03110206, on downstream side of concrete bridge on State Highway 16, 0.5 mi (0.8 km) southeast of Florida State Prison, 3.3 mi (5.3 km) east of Raiford, 9.5 mi (15.2 km) northwest of Starke and 22 mi (35 km) upstream from mouth.

DRAINAGE AREA.--88.1 mi² (228.2 km²).

PERIOD OF RECORD.--Discharge measurements: 1958, 1960, 1965, 1967 (one to four discharge measurements each year); October 1975 to May 1977 (gage heights and discharge measurements only) discontinued.
Temperature observations: October 1975 to May 1977 (discontinued). Results of miscellaneous temperature observations prior to October 1975 are available in files of Geological Survey.

GAGE.--Nonrecording gage and crest-stage gage. Altitude of gate is 110 ft (33.5 m) from topographic map.

EXTREMES FOR PERIOD OF RECORD.--Discharge (1958, 1960, 1965, 1967, 1975-77): Maximum discharge measured, 2,060 ft³/s (58.3 m³/s) Mar. 18, 1960; minimum measured, 0.40 ft³/s (0.011 m³/s) May 25, 1965.

Water temperatures (1975-77): Maximum temperature observed, 27.5°C Aug. 31, 1976; minimum observed, 8.0°C Jan. 12, 1977.

SUWANNEE AND AUCILLA RIVERS

SANTA FE RIVER BASIN

02321500 SANTA FE RIVER AT WORTHINGTON SPRINGS, FL

LOCATION.--Lat 29°55'18", long 82°25'35", in SE¼ sec.32, T.6 S., R.19 E., Alachua County, Hydrologic Unit 03110206, near center of span on downstream side of bridge on State Highway 121, 0.5 mi (0.8 km) south of Worthington Springs, 0.8 mi (1.3 km) downstream from New River, and 51 mi (82 km) upstream from mouth.

DRAINAGE AREA.--575 mi² (1,489 km²).

PERIOD OF RECORD.--October 1931 to current year. Prior to October 1965 published as "near Worthington." Monthly discharge only for October 1931, published in WSP 1304.

REVISED RECORDS.--WSP 2105: WDR FL-76-4: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 42.74 ft (13.027 m) above mean sea level (levels by Corps of Engineers). Prior to Jan. 16, 1939, nonrecording gage at site 0.2 mi (0.3 km) downstream at same datum and Jan. 16, 1939, to July 23, 1953, nonrecording gage at present site and datum.

REMARKS.--Records good. Records do not include diversion, during periods of high stages from Santa Fe Lake through Lochloosa Creek in St. Johns River basin. Records of chemical analyses and water temperatures for the current year are published in this report entitled "Daily Measurements".

AVERAGE DISCHARGE.--46 years, 442 ft³/s (12.51 m³/s), 10.44 in/yr (265 mm/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 20,000 ft³/s (566 m³/s) Sept. 13, 1964, gage height, 28.40 ft (8.656 m); minimum, 0.50 ft³/s (0.014 m³/s) June 24, 1955, gage height, 6.74 ft (2.054 m).

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,930 ft³/s (54.7 m³/s) Feb. 7, gage height, 17.08 ft(5.206 m); minimum, 5.2 ft³/s (0.15 m³/s) July 28,29, gage height, 7.02 ft (2.140 m).

SUWANNEE AND AUCILLA RIVERS

SANTA FE RIVER BASIN

02321600 OLUSTEE CREEK NEAR LULU, FL

LOCATION.--Lat 30°05'42", long 82°28'25", in SW¼ sec.36, T.4 S., R.18 E., Columbia County, Hydrologic Unit 03110206, at bridge on State Highway 100, 1.4 (2.3 km) southeast of Lulu, 7.4 mi (11.9 km) upstream from Swift Creek, and 18 mi (29 km) upstream from mouth.

DRAINAGE AREA.--49.1 mi² (127.2 km²).

PERIOD OF RECORD.--Discharge measurements: 1965-67, 1969-73, 1975 (one to three discharge measurements each water year); November 1964 to current year (crest-stage partial record); October 1975 to May 1977 (gage heights and discharge measurements only) discontinued as a periodic measuring site.
Temperature observations: October 1975 to May 1977. Results of miscellaneous temperature observations prior to October 1975 are available in files of Geological Survey.

GAGE.--Nonrecording gage and crest-stage gage. Datum of gage is 100 ft (30.48 m) above mean sea level.

REMARKS.--Annual maximum is published in the section of this report entitled:. DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES.

EXTREMES FOR PERIOD OF RECORD.--Discharge (1965-67, 1969-73, 1975-77): Maximum discharge, 2,130 ft³/s (60.3 m³/s) Mar. 29, 1970; maximum gage height, 19.62 ft (5.980 m) Sept. 13, 1964 (from floodmark, discharge not determined). Maximum discharge measured, 685 ft³/s (19.4 m³/s) Aug. 23, 1975; no flow observed, Apr. 29, 1968; minimum gage height observed, 8.53 ft (2.60 m) May 25, 1977.
Water temperature (1975-77): Maximum temperature observed, 24.0 °C Aug. 31, 1976; minimum observed, 8.0 °C Jan. 12, 1977.

0232200 SANTA FE RIVER NEAR HIGH SPRINGS, FL

LOCATION.--Lat 29°50'33", long 82°37'52" in NE¼ sec.32, T.7 S., R.17 E., Columbia County Hydrologic Unit 03110206, near right bank on downstream side of bridge on U.S. Highway 27, 100 ft (30 m) upstream from Seaboard Coast Line Railroad bridge, 2.0 mi (3.2 km) northwest of High Springs, and 25 mi (40 km) upstream from mouth.

DRAINAGE AREA.--868 mi^2 (2,248 km^2).

PERIOD OF RECORD.--Discharge measurements: January 1931 to September 1971; October 1975 to May 1977 (gage heights and discharge measurements only), discontinued.
Temperature observations: October 1967 to September 1971, October 1975 to May 1977 (discontinued). Results of miscellaneous temperature observations prior to October 1967 are available in files of Geological Survey.

REVISED RECORDS.--WSP 1704: 1948.

GAGE.--Nonrecording gage. Datum of gage is 26.36 ft (8.034 m) above mean sea level (levels by Florida Department of Transportation, Florida Department of Transportation bench mark). Prior to Jan. 9, 1933, nonrecording gage at same site and datum. Jan. 9, 1933 to Sept. 1971, water stage recorder at same site and datum.

REMARKS.--Discharge occasionally affected by backwater from Suwannee River.

EXTREMES FOR PERIOD OF RECORD.--Discharge (1931-71, 1975-77): Maximum discharge, 20,000 ft^3/s (566 m^3/s) Sept. 15, 1964; maximum gage height, 18.96 ft (5.779 m) Sept. 16, 1964 (backwater from Suwannee River); minimum discharge, 31 ft^3/s (0.88 m^3/s) Apr. 28 to May 5, 1956; minimum gage height, 0.38 ft (0.116 m) May 21, 22, 1957.
Water temperatures (1975-77): Maximum temeperature observed, 27°C July 26, 1968; minimum observed, 14°C Mar. 28, Oct. 29, 1968, Mar.10, 1969.

SUWANNEE AND AUCILLA RIVERS

SANTA FE RIVER BASIN

02322008 TURKEY CREEK NEAR HAGUE, FL

LOCATION.--Lat 29°44'45", long 82°24'25", in SW¼ sec.34, T.8 S., R.19 E., Alachua County, Hydrologic Unit 03110206, on downstream side of culvert on county road, 1.8 mi (2.9 km) south of Hague Railroad Station, and 5.5 mi (8.8 km) southeast of Alachua.

DRAINAGE AREA.--5.65 mi^2 (14.63 km^2).

PERIOD OF RECORD.--Discharge measurements: October 1975 to May 1977 (gage heights and discharge measurements only), discontinued.
Temperature observations: October 1975 to May 1977 (discontinued).

GAGE.--Nonrecording gage and crest-stage gage. Altitude of gage is 135 ft (41.1 m), from topographic map.

EXTREMES FOR PERIOD OF RECORD.--Discharge (1975-77): Maximum discharge measured, 6.2 ft^3/s (0.18 m^3/s) Dec. 16, 1976, gage height, 7.80 ft (2.38 m); minimum measured, 0.75 ft^3/s (0.021 m^3/s) Dec. 16, 1975 and April 6, 1977, gage height, 7.06 ft (2.15 m).
Water temperatures (1975-77): Maximum temperature observed, 27.0 °C May 4, 1977; minimum observed, 7.0 °C Jan. 13, 1977.

02322020 TURKEY CREEK TRIBUTARY AT HAGUE, FL

LOCATION.--Lat 29°46'15", long 82°25'47" in SE¼ sec.20, T.8 S., R.19 E., Alachua County, Hydrologic Unit 03110206, upstream side of culvert on U.S. Highway 441, 0.3 mi (0.5 km) east of General Electric Plant, 0.8 mi (1.3 km) west of Hague Railroad Station, and 2.0 mi (3.2 km) southeast of Alachua.

DRAINAGE AREA.--1.68 mi^2 (4.35 km^2).

PERIOD OF RECORD.--Discharge measurements: October 1975 to May 1977 (gage heights and discharge measurements only), discontinued.
Temperature observations: October 1975 to May 1977 (discontinued).

GAGE.--Nonrecording gage and crest-stage gage. Altitude of gage is 125 ft (38.1 m) from topographic map.

REMARKS.--Some contributing flow from industrial plant above station.

EXTREMES FOR PERIOD OF RECORD.--Discharge (1975-77): Maximum discharge measured, 4.2 ft ^{3}/s (0.12 m^3/s) Dec. 16, 1976; maximum gage height, 8.93 ft (2.72 m) Feb. 3, 1977 (discharge not determined); minimum discharge measured, 1.4 ft ^{3}/s (0.040 m^3/s) July 15, 1976; minimum gage height observed, 7.20 ft (2.19 m) Mar. 16, 1977.
Water Temperatures (1975-77): Maximum temperature observed, 27.0 °C Oct. 15, 1975 and May 4, 1977; minimum observed, 12.0°C Jan. 13, 1977.

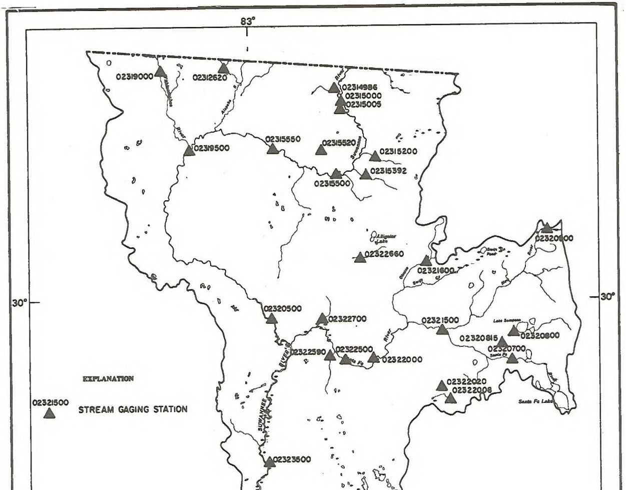

Figure 4. Location of stream gaging stations in the Waccasassa and Suwannee River basins and the coastal area between the Withlacoochee and Suwannee Rivers.

APPENDIX 9

RECLAMATION METHODS -- CURRENT TECHNOLOGY

Water Body Construction

Mine cuts left by the strip mining process fill with water soon after mining, providing the confining substrate is not breached and the water table level is reestablished. The contouring of overburden windows cast by draglines to form land and lake areas was one of the earliest reclamation techniques employed. Bulldozers and pans are used in this procedure to grade the spoil piles to more gentle slopes. Proper construction of lakes requires detailed engineering to insure that the reclaimed lakes will conform to on- and off-site drainage requirements, once the water table has been entirely reestablished. Reclamation lakes frequently are used as part of the mine water recirculation system during the active mining phase of the operation, and therefore must serve both operational and post-reclamation water use needs.

In land areas reclaimed from spoils, soil stability is generally adequate for residential and light industrial construction. Several reclaimed lake areas have been developed as residential communities. Reclaimed lakes have also been used as water reservoirs for irrigational aquatic wildlife/recreation areas, and as aesthetic enhancements to surrounding reclaimed land.

The depth and configuration of the new lakes varies with the thickness and shape of the original overburden and matrix; many reclaimed lakes are deeper and have narrower littoral zones than natural Florida lakes.

Sand Tailings Fill

Backfilling mined cuts with tailings sand from the flotation process is accomplished by hydraulically transporting the tailings from the flotation plant to the landfill site. The level of filling may be adjusted to determine the post-reclamation drainage and water table characteristics. Tailings sand dewaters rapidly, and filled areas can support grading machinery almost immediately. It is common practice to cover tailings landfills with overburden material (from protruding spoil piles or nearby areas) in order to improve soil fertility, structure, and moisture retention. Pans and/or bulldozers are used to spread the overburden material to the appropriate thickness.

Clay Fill

In this reclamation procedure, a substantial portion of the area mined is used for the disposal of clay wastes produced in the ore separation-washing process. Due to water entrainment, impounded clays occupy considerably more volume, than clays in their natural state, and release water very slowly. Therefore, it is usually necessary to store a significant portion of the clays above natural ground level and to construct retaining dikes. The current method of reclaiming clay settling areas is to promote surface drainage in order to dry the area and form a surface crust layer. In the first step, a perimeter drainage ditch is often dug by a small dragline situated on the retaining dike. As the surface bearing strength increases, internal drainage ditches are installed and maintained, using plows pulled by special low ground pressure vehicles. The impounded clays dry at varying rates, and require a lengthy program of drainage maintenance. Once a sufficiently stable crust has formed, volunteer vegetative growth is cleared using wide-track bulldozers or heavy bushhog type rotary cutters drawn by low ground pressure vehicles.

The subsidence and crust development phase of settling area reclamation may last several years. During this phase, land clearing and seedbed preparation usually can proceed in the drier areas. When the development of the crust is complete, the retaining dikes are spread toward and away from the impoundment to conform to established slope requirements and produce a smoother landscape. Some of the dike material may be used to fill any depressions still left in the settling area itself.

Once surface drainage has been established, phosphatic clays are a very favorable medium for plant growth. Due to their content of apatite, dolomite, and microcline feldspar, the clays have high levels of Ca, P, Mg, and K available to plants. Their high content of silt and clay, particularly montmorillonite, gives them excellent water-holding capacity.

An alternative to the crust development technique is the use of a tailings sand layer to cap the clay settling areas. This method is distinct from sand-clay mix techniques in that its goal is to establish a sand layer cap rather than a mixture of sand and clay. Sand from a tailings disposal pipeline is introduced into a deactivated settling area and the pipeline advanced as the sand layer forms. Typically, mud waves of clay form ahead of the advancing sand and dry to form clay ridges. Final grading eliminates pockets and ridges, and may spread the perimeter dike material over the settling area.

Capping clay settling areas with a thick layer of sand has disadvantages regarding revegetation, but the surface stability of these areas is somewhat improved. The real advantage of this technique is that it reduces the time required to achieve surface stability.

Sand-Clay Mix Fill

Using a mixture of sand and clay to backfill mine cuts is a recent reclamation development in the phosphate industry. Many past attempts to use such a mixture have been hindered by the tendency of sand particles in suspension to separate and settle much more rapidly than clay particles, and therefore prevent the achievement of a homogeneous backfill. Sand-clay mix research continues to have high priority in the industry. Field scale applications are presently limited but growing rapidly.

These techniques have shown promise:

--Sand Spraying. Sand tailings are sprayed over naturally prethickened (12% to 15% solids) clays. The resulting compaction and channeling releases water. For prethickening, the clays are placed in mined cuts--a procedure requiring detailed planning and scheduling of events.

--Flocculation-Mix. Chemical flocculants and thickeners are utilized to dewater the clay slurry to about 12% solids.

The thickened clay slurry is used to repulp dewatered flotation tailings, and the mixture is pumped to waste disposal areas for further settling. This technique promises simplified water management because of rapid water recovery.

--Dredge-Mix. Prethickened clay, dredged from settling ponds, is mixed with dewatered sand tailings and pumped to mined cuts. This technique permits the independent operation of desliming and flotation facilities.

The development of these techniques has gained considerable support because of the attractiveness of sand-clay mix as an alternative to traditional above-grade clay impoundment, as well as the more economical usage of water resources. The use of sand-clay mix as landfill may allow reclamation to proceed at a more rapid pace, since the mixture dewaters and stabilizes more rapidly than does clay alone.

Properly mixed sand-clay soils are expected to have excellent agricultural potential. The clay fraction imparts fertility, nutrient-retention properties, and water holding capacity to the soil, while the sand contributes tillage and aeration qualities. However, under present practice the sand-clay mix is often capped with overburden or tailings sand, and its agronomic potential is not realized. Soil stability is superior to sand tailings landfills and to the recontoured spoils associated with lake areas.

Overburden Fill

The overburden fill technique consists of filling mine cuts with overburden (spoil) hauled in from adjacent mining areas. Overburden fills can have excellent bearing strength and have been used for industrial sites as well as residential developments.

APPENDIX 10

UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

Possible Reestablishment of Sawtimber Production Following Mining in the Osceola National Forest, An Analysis of the State-of-the-Art

February 9, 1978

By J. Scott Boyce

Open-File Report 79 - 524

1979

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Possible Reestablishment of Sawtimber Production
Following Mining in the Osceola National Forest,
An Analysis of the State-of-the-Art

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ABSTRACT

There is a good possibility that sawtimber production could be reestablished on the Osceola National Forest. Engineering technology that is coming on-line should allow the establishment of land/water relationships that meet the requirements of desired tree species. Information available on soil-plant relationships indicate an absence of phytotoxic materials in various mining wastes and that good tree growth is possible.

INTRODUCTION

The question of whether it would be possible to reestablish and manage commercial sawtimber operations on mined lands within the Osceola National Forest is critical in evaluating the costs of mining in terms of renewable resources. This report addresses that question.

If intensive silviculture proves to be feasible, it would be one of many management options for the mined lands. The ecological consequences of the silvicultural possibilities considered are beyond the scope of this document.

No systematic research has been performed on reforestation or forest management techniques on land mined for phosphate in Florida. However, careful observation of the vegetation on mined sites in central Florida, research results from other mine reclamation situations outside of Florida, and the professional opinions of scientists and engineers involved in mining, reclamation, and forestry are available and shed considerable light on the question of whether it would be possible to reestablish commercial sawtimber operations on the Osceola National Forest following phosphate mining.

BACKGROUND INFORMATION

Phosphate mining that is carried out in central Florida and that would be carried out in the Osceola National Forest in north-central Florida are very similar. Both the phosphate ore, commonly referred to as the matrix, and the overburden are unconsolidated. A cross section of the overburden and matrix in the Osceola National Forest is given in Figure 1. The area to be mined is dewatered by means of peripheral wells and ditches, as water tables typically are at or near the surface. The overburden is removed with a dragline. The same dragline removes the matrix and delivers it to a sump where it is broken up with high pressure water jets and then pumped hydraulically to a beneficiation plant where the ore is upgraded by screening and flotation processes. The waste products from the beneficiation plant consist of sand tailings, essentially silicate sands, and clay slimes composed of clay minerals and colloidal phosphate. Disposal of these wastes, and the clay slimes in particular, has been a major problem for the phosphate industry as the clay slimes are very slow to dewater and require a high storage volume; the volume of slimes is typically twice the volume of the matrix removed.

Current mining practice typically creates mined out pits filled with water and windrows of overburden, sand tailing piles, and clay slimes storage areas (typically mined pits with above grade dikes around them). Each of these wastes has its own reclamation characteristics. The mine pits are usually reclaimed to a land and lakes configuration and applied to various uses including agriculture (largely grazing) or sometimes residential development. The slime ponds after several decades are reclaimed to light agriculture, typically grazing, and the tailings sands, if not returned to the mine pits, are stabilized with vegetation. However, new waste handling processes exist that overcome the clay storage problems and should facilitate reclamation of lands mined for phosphate.

ENGINEERING CONSIDERATIONS

To reestablish commercial sawtimber production after mining, it would be necessary to rebuild a land surface and rooting medium that met the requirements of the trees to be grown and also provide access and support for the machinery used in planting, managing, and harvesting the trees. Modern mining and beneficiation methods produce three materials that can serve as resources for rebuilding the land: overburden, clay slimes, and sand tailings. As a result of research into clay slime disposal techniques, three methods have been developed that allow the clays to be returned to the mine pits and covered with overburden (Zellars and Williams, 1978, pp. 73-78). These methods are classified as: 1) sand spraying---sand tailings are sprayed over naturally prethickened clays; 2) flocculation mix---chemical flocculants and thickeners are utilized to dewater the clay slurry; and 3) dredge mix--prethickened clay is dredged from settling ponds, mixed with dewatered sand tailings, and pumped to mined-out cuts. In all of these methods, sand tailings are mixed with clay slimes, thereby disposing of these waste products simultaneously. Additional sand tailings may be buried or used as a surface material as required. The Brewester Phosphate Company of Bradley, Florida, is currently using the sand spraying technique and it appears to be economically competitive with above-ground storage of slimes. It is also anticipated that the flocculation-mix and dredge-mix methods will prove economically feasible. When the clays and sands are returned to the mine pits, the volume of solids in the pits is greatly increased, and the volume of lakes left after mining is proportionately reduced. The materials balance, i.e., ratio of overburden, clay, and sand, will vary with the specific mining situation. However, the revegetation problem is greatly simplified by the fact that none of these materials are toxic to plant growth.

The Final Environmental Statement (U.S. Bureau of Land Management,

1974) and its supplement (U.S. Bureau of Land Management, in preparation) consider two possible mining and beneficiation configurations: one with the beneficiation plant off the Forest, which would preclude returning the slimes and sand tailings to the mine pits (FES 74-37), and the second with two beneficiation plants on the Forest, which would allow the slimes and sand tailings to be returned (Supplement). For the purposes of this analysis, the latter situation is assumed as it represents the Cole Mining Plan (Cole, 1977), which was the basis for USGS (Miller and others, 1978) and FWS (U.S. Fish and Wildlife Service, 1978) reports used in preparing the Supplement. One can easily progress from this case to the more limited possibilities presented by the off-forest beneficiation situation discussed in FES 74-37.

In considering the possible mining of the Osceola National Forest, the following picture of land/water relationships evolves:

1. Soon after mining, the water table will reestablish itself to near its present level, and will become a subdued replica of the surface topography. Any filled pits will become lakes. Annual changes in depth to water tables in reclaimed land areas might be 2 to 3 feet greater than before mining. (Personal communication with several hydrologists familiar with the hydrology of the Osceola National Forest. Also see Miller and others, 1978).
2. All soil hardpans will be eliminated by mining.

3. By varying the volume of lakes, the elevation of the land surface above or below the water table can be adjusted to meet the requirements of the target tree species.
4. The land surface can be engineered to meet the drainage requirements of the target species. Long-term settling of sand/clay fill material is expected and can be compensated for. (Personal communication, Brownwell Engineering Co., Lakeland, Florida) Because the fills will be below the water table, they will not significantly affect soil internal drainage patterns.
5. The land surface can be expected to be composed of overburden, although, it is conceivable that it may be necessary to use sand tailings in lieu of overburden if the latter is in short supply.

In summary, the technology exists to allow the rebuilding of land/water relationships to meet widely varied design criteria; however, field testing of much of the technology has not been carried out.

SOIL-PLANT RELATIONSHIP ON PHOSPHATE-MINED LANDS IN FLORIDA

The combination of nontoxic mining wastes, a well-watered subtropical environment, and a large biological resource, i.e., many different plant species available for recolonization, results in the natural reestablishment of some type of vegetation on mine disturbed areas, and indicates the relative absence of major revegetation problems, such as acid formation, high soil temperatures due to dark coloration, and large competent rocks.

Field observations in central Florida of naturally revegetated forest communities growing on old mine sites, of pine plantations growing on old mine waste disposal areas and native soils, small groves of pines planted in overburden materials for aesthetic reasons, recent trial plantings designed to determine the utility of various tree species in different reclamation environments, various single trees planted under widely varying conditions, and citrus groves on overburden all attest to the utility of overburden and similar mine wastes as a substrate for tree growth. Figures 2 through 7 show examples of tree growth on various mine wastes and native soils. Table 1 gives data on tree growth in a pine plantation on mine wastes and native soils. Taken collectively, these figures and tables indicate that phosphate mine wastes are a reasonably good substrate for tree growth. The data in Table 1 suggest that some mine wastes are superior to native soils for slash pine production (Plot 1 vs. Plot 2). Breedlove and Adams (1977, p. 15) state the oak hammock/longleaf pine communities occurring on the oldest mine sites are characterized by growth rates approximately twice those of unmined areas. These observations are modified by the fact that the history of the sites is not fully known, the characteristics of the wastes have not been rigorously identified, and the characteristics of the mining operations and the wastes have changed over time. On the other hand, the fact that these observations are numerous and have been made over widely varying conditions broadens the applicability of the data base and suggests that no particular problem exists. Zellars and Williams (1978, p. 79) discuss commercial forest plantings on lands mined for phosphate as a foregone conclusion and go on to state that . . . "Commercial forest plantings on reclaimed land have not been popular with the industry in central Florida, as it is not a traditional wood production area . . . . In all probability, commercial forest planting will be a revegetation option infrequently used by the phosphate industry in the southern area, but may be a common designated land use for the northern district." However, they also point out that there are environmental pressures to plant clusters of relatively dense tree stands in areas that are being reclaimed to pasture in order to increase the diversity of habitat.

In considering the mine wastes, some fairly good generalizations can be made concerning their general characteristics and ability to support plant growth and tree growth in particular:

1. Sand tailings--Sterile silicate sands, drouthy when deep; can be very productive under intensive irrigation and fertilization; a small number of sand pines planted in sand tailings in north Florida near the Osceola National Forest are making slow growth. The *Eucalyptus* shown in Figure 7 are growing on sand tailings in central Florida.
2. Clay slimes--Very fertile, poorly drained clay and colloidal phosphates; low bearing strength; generally considered unsuitable for tree growth in the pure state; a potential source of clays and nutrients to ameliorate the sand tailings.

3. Overburden--A heterogenous material varying from sand to clayey sand that typically contains more clay, has a higher pH level and contains more exchangeable bases than native upland soils; it has, however, proven to be an acceptable growth medium for many species of plants. The pines in Figure 6 are growing on overburden produced by present day mining methods. These trees have probably benefitted from fertilization of the adjacent pasture.

4. Debris--A waste material derived from the phosphate matrix and produced prior to modern flotation methods. It is sandy and essentially consists of the phosphate matrix less the pebble. Although no data are available, it is anticipated that debris is somewhat higher in available phosphate than overburden. The fact that the phosphate mineral is largely apatite indicates that any increase in available phosphorus would be small. The pines shown in Figures 4 and 5 and the data in Table 1, plots 2 and 3, are thought to be from debris lands.

In considering the biological resource available for reforestation, one generally thinks of various southern pines, as well as native hardwood species; however, even exotic species, such as those of the genus *Eucalyptus*, may have considerable utility. The latter notwithstanding, the general thinking at this time is that reclamation should make maximum use of native species. If a target species or several species are identified, it would be highly desirable to invest in research aimed at quantifying substrate/plant growth relationships. However, in the absence of such research, a good estimate as to how to reforest and manage phosphate lands can be made on the basis of knowledge in the field of forestry, soils, and mine reclamation. For example, if slash pine is the target species, conventional wisdom is that the loss of hardpans would be desirable; that the water table would best be maintained at a depth of several feet, but that the species will tolerate considerable variation in water table depth and is relatively tolerant to periodic flooding; that tree growth, at least initially, would be limited by lack of nutrients, particularly nitrogen; and that fertilization would be desirable, or that perhaps the surface layer of soil should be saved for spreading on the post-mining surface to provide nutrient reserves and microflora populations, as many plants including pines respond dramatically to the proper mycorrhiza innoculum on disturbed sites.

Monk (1968) in his report on the "Successional and Environmental Relationships of the Forest Vegetation of North Central Florida" sheds considerable light on the characteristics of the current plant communities and environmental requirements of the native tree species. He indicates that species such as _Pinus elliottii_ (slash pine), _P. taeda_ (loblolly), and _P. palustris_ (longleaf) are wide ranging successional species and as such are habitat generalists. These contrast with the "climax exclusives" which tend to occupy specific environmental situations.

The three pines listed above are major timber species and dominant members of the pine flatwoods community. It is the pine flatwoods community that produces most of the timber on the Osceola National Forest and which would be affected most by mining. Additionally, Monk's work indicates that a number of other native timber-production species growing in the vicinity are also habitat generalists. Figures 4-6 show slash and loblolly pine growing vigorously in various post-mining situations. This strongly suggests that these timber species would grow well over a range of post-mining situations.

Table 2 gives an idea of the size of the native biological resource available and the plant communities in which the various species are found. The various plant communities represent a broad range of environmental conditions from swamps (mixed hardwood swamps, bay heads, cypress domes) to well drained sites (sand hills) and contain many timber species. The broad adaption of slash pine and longleaf pine is evident. However, the range of environmental conditions over which a species has silvicultural utility may be greater than the range over which they grow naturally, as reproductive, competitive, and other ecological and environmental relationships can be altered by management practices. Trees are grown successfully in many areas where they do not grow naturally; an extreme example of this is the windbreaks and manmade forests of the Great Plains, e.g., Halsey National Forest, Nebraska.

The combination of level terrain, nontoxic overburden, a well-watered subtropical environment, a large biological resource including several habitat generalists that are important timber species, and numerous examples of groups and stands of trees growing on various phosphate mine wastes, all add credence to the idea that forests could be reestablished on lands mined for phosphate within the Osceola National Forest. An evaluation of both the biological and engineering information available indicate that such reforested areas could be managed for sawtimber production. On the other hand:

1. The possibility of large tree plantations on fresh geologic material with at least temporarily impoverished microflora and fauna populations, different soil-water relationships, and different chemical and physical properties carries with it the possibility that some unidentified insect, disease, weed species, or damaging rodent might thrive under these conditions and render the land useless for commercial timber production.
2. Techniques discussed in this report for rebuilding the land/water relationships have not been extensively field tested and represent a level of sophistication greater than that which is common in the mining industry at present.
3. Much of the information available on phosphate mine reclamation was largely gathered in central Florida, where the water table is lower than that on the Osceola National Forest, and where the geologic materials and climate differ to some extent.

However, while it is necessary to recognize the possible existence of unforeseen and potentially devastating problems, the author's experience leads him to believe that the probability of such problems materializing is small.

CONCLUSION

Information currently available indicates there is good possibility that commerical sawtimber production can be reestablished on lands mined for phosphate within the Osceola National Forest.

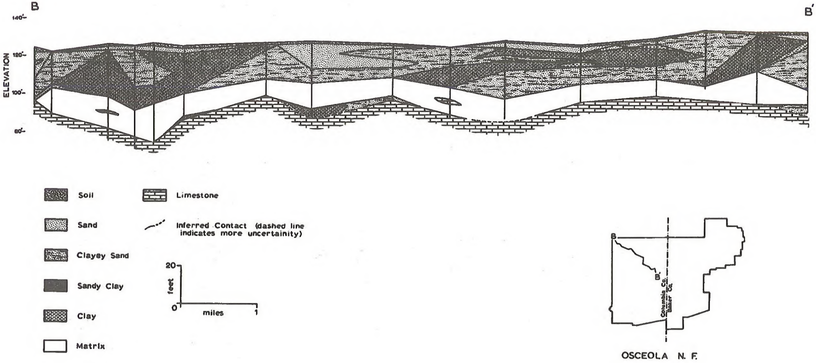

Figure 1. Overburden and matrix, Osceola National Park Forest. After U.S. Bureau of Land Management (1974)

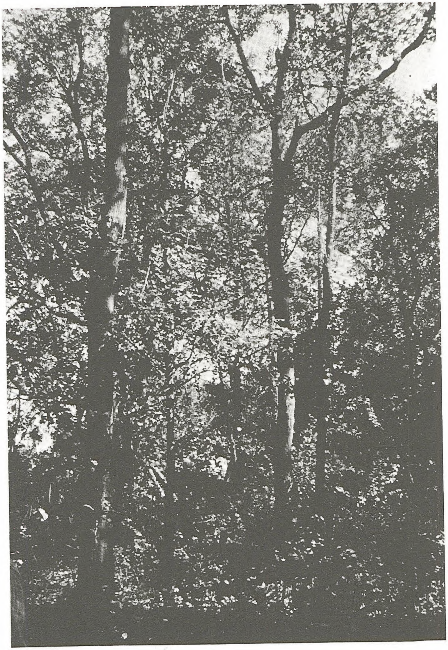

Figure 2. Volunteer hardwoods on an overburden pile. The area was mined about 1910.

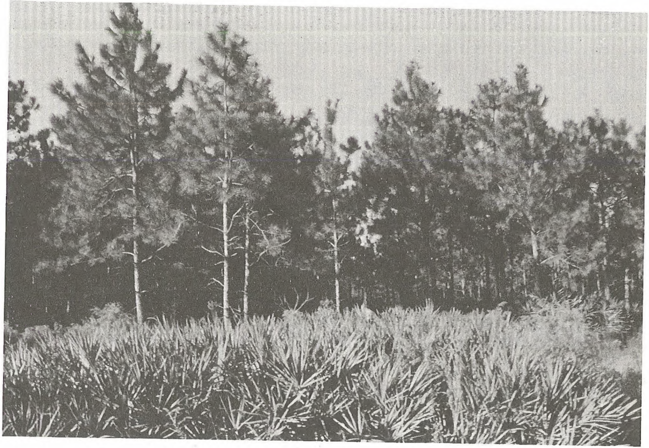

Figure 3. Eighteen-year-old slash pines planted on native soils adjacent to mined area shown in Figure 4; area mined in 1929.

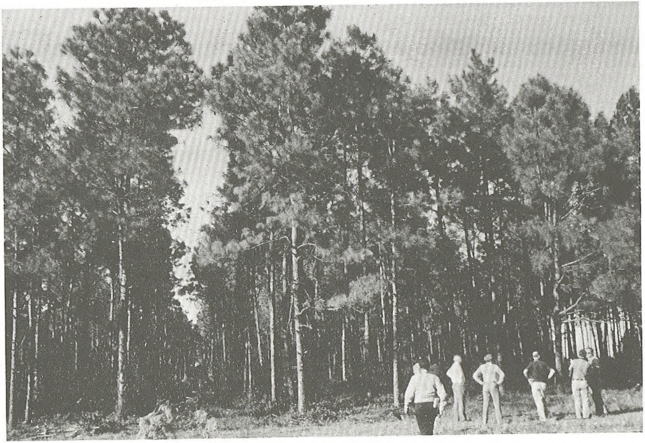

Figure 4. Eighteen-year-old loblolly pine planted on mine wastes, probably debris; area mined in 1929.

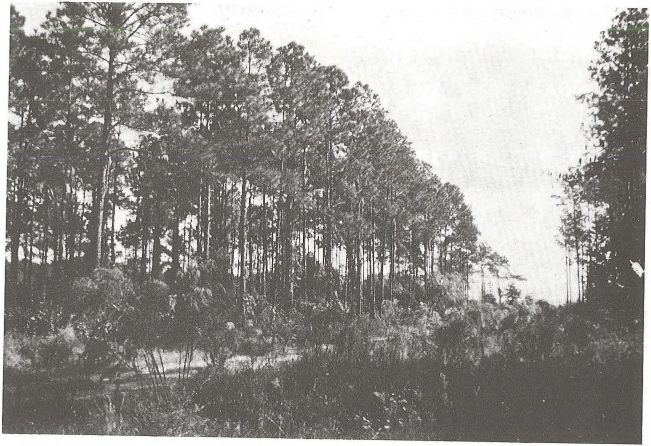

Figure 5. Thirty-three-year-old slash pine planted on mine wastes, probably debris; date of mining unknown.

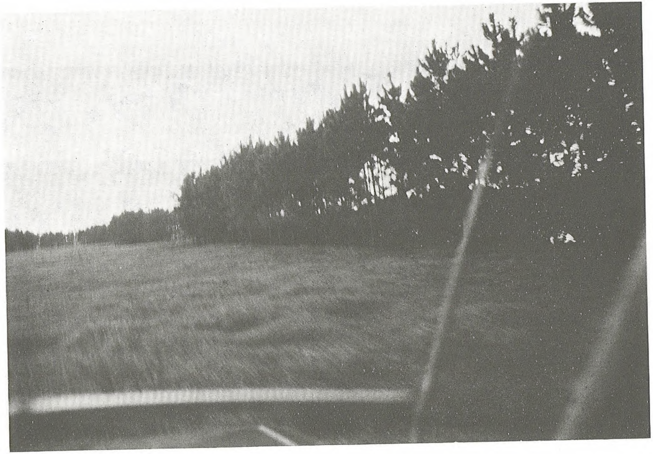

Figure 6. Thirteen-year old slash pine planted on overburden along a lake in a mined area reclaimed to a land and lakes configuration. The lake is beyond the trees, with pasture in the foreground.

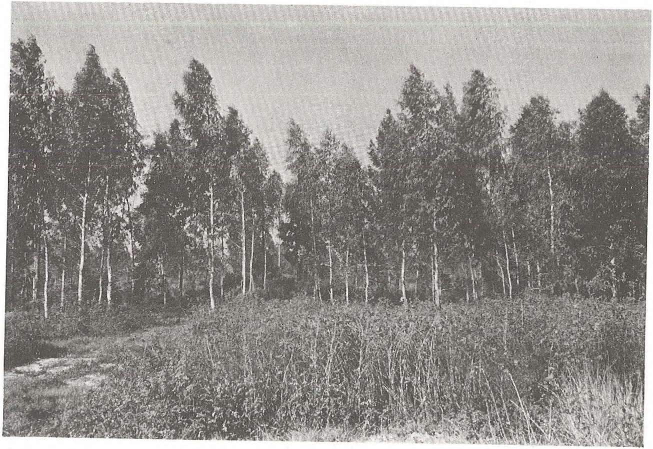

Figure 7. Four-year-old Eucalyptus growing on sand tailings.

Table 1 - Growth of pines on native soil and mine wastes

(Data provided by Agrico Chemical Company, Mulberry, Florida.)

Plot #1 - 37 Acres - Bedded Slash Pine - 18 years old, planted 6 x 10 feet on native soil - Ground cover: palmetto, wiregrass, dogfennel, grapevine , broom sage, briars.

Avg. DOB* all living trees in 200 planting spaces	6.83 inches
Avg. DOB sample trees (43 samples every 5th)	7.18 inches
Avg. height sample trees	31.14 feet
Avg. DBT* sample trees	1.35 inches
Maximum diameter all living trees	9.80 inches
Minimum diameter all living trees	3.20 inches
Maximum diameter sample trees	9.80 inches
Minimum diameter sample trees	5.00 inches
Maximum height sample trees	40 feet
Minimum height sample trees	23 feet
Survival rate based on 200 spaces	43.5%

Plot #2 - 30 Acres - Bedded Slash Pine - 18 years old, planted 6 x 10 feet on land mined 1926 - Reclamation method unknown - Ground cover: Russian nettle, grapevine, guava bushes.

Avg. DOB all living trees in 200 planting space	7.41 inches
Avg. DOB sample trees (42 samples every 5th)	8.05 inches
Avg. height sample trees	44.24 feet
Avg. DBT sample trees	1.22 inches
Maximum diameter all living trees	10.70 inches
Minimum diameter all living trees	4.50 inches
Maximum diameter sample trees	10.70 inches
Minimum diameter sample trees	5.00 inches
Maximum height sample trees	52 feet
Minimum height sample trees	36 feet
Survival rate based on 200 planting spaces	42%

Plot #3 - 26 Acres - Bedded Loblolly Pine - 18 years old, planted 6 x 10 feet on land mined 1926 - Reclamation method unknown - Ground cover: Russian nettle, grapevine, guava bushes.

Avg. DOB all living trees in 200 planting spaces	7.56 inches
Avg. DOB sample trees (44 samples every 5th)	8.03 inches
Avg. height sample trees	50.05 feet
Avg. DBT sample trees	1.10 inches
Maximum diameter all living trees	12.10 inches
Minimum diameter all living trees	4.80 inches
Maximum diameter sample trees	12.10 inches
Minimum diameter sample trees	5.10 inches
Maximum height sample trees	60 feet
Minimum height sample trees	39 feet
Survival rate based on 200 planting spaces	50.5%

*DOB: Diameter outside bark
*DBT: Double bark thickness

Table 2. Precent of occurence of tree species (potential to reach a 4-in dbh size) in each of six forest community types in north central Florida. Data are based on 60 southern mixed hardwoods, 24 mixed hardwood swamps, 9 bayheads, 15 cypress domes, 32 flatwoods, and 16 sandhills. After Monk, 1968.

Species	Southern Mixed Hardwoods	Mixed Hardwood Swamps	Bay-heads	Cypress domes	Flat-woods	Sand-hills
Acer barbatum	21	---	---	---	3	---
A. negundo	8	4	---	---	---	---
A. rubrum	33	100	22	53	53	---
Aesculus pavia	13	---	---	---	---	---
Alnus serrulata	---	4	---	---	---	---
Aralia spinosa	46	---	11	---	---	---
Aronia melanocarpa	---	29	---	---	---	---
Betula nigra	2	4	---	---	---	---
*Bumelia lanuginosa	23	---	---	---	---	---
*B. tenax	3	---	---	---	---	---
Carpinus caroliniana	52	38	---	---	---	---
Carya aquatica	3	21	---	---	---	---
C. glabra (inc. tomentosa)	77	8	---	---	3	19
Celtis laevigata	33	---	---	---	3	---
Cephalanthus occidentalis	7	83	33	67	3	---
Cercis canadensis	23	---	---	---	---	---
Chionanthus virginicus	7	---	---	---	3	---
*Cinnamomum camphora	2	---	---	---	12	---
Cornus florida	38	---	---	---	3	6
Crataegus marshallii	11	---	---	---	---	---
C. uniflora	15	---	---	---	---	25
*Cyrilla racemiflora	2	---	11	---	---	---
Diospyros virginiana	41	4	---	---	34	69
Fraxinus profunda	34	---	---	---	3	---
F. caroliniana	---	92	---	---	---	---
Gleditsia aquatica	2	29	---	---	---	---
*Gordonia lasianthus	2	---	78	20	28	6
Ilex ambigua	23	---	---	---	---	---
*I. cassine	10	88	44	53	28	---
I. decidua	3	---	11	---	---	---
*I. opaca	79	4	---	---	9	---
*Illicium floridanum	---	---	22	---	---	---
*Juniperus virginiana	38	8	---	---	---	---
*Leucothoe sp.	---	---	22	---	---	---
Liquidambar styraciflua	77	71	33	20	34	6
Liriodendron tulipifera	---	---	11	---	3	---
*Lyonia ferruginea	28	---	---	---	56	19
*Magnolia grandiflora	85	---	22	13	25	6
*M. virginiana	13	21	100	60	37	---
Morus rubra	51	---	---	---	---	6
*Myrica cerifera	39	75	56	93	84	31
Nyssa aquatica	2	---	---	---	---	---
N. sylvatica (inc. biflora)	41	88	56	100	47	---

Table 2--Continued

Species	Southern Mixed Hardwoods	Mixed Hardwood Swamps	Bay-heads	Cypress domes	Flat-woods	Sand-hills
**Osmanthus americanus*	52	---	11	---	---	---
Ostrya virginiana	48	---	---	---	---	---
**Persea borbonia*	79	---	---	---	---	12
**P. palustris*	13	63	100	53	47	---
**Pinus clausa*	2	---	---	---	6	19
**P. elliottii*	18	---	44	93	72	50
**P. glabra*	25	---	---	---	---	---
**P. palustris*	2	---	---	---	59	100
**P. taeda*	26	17	11	---	12	31
**P. serotina*	---	---	11	---	41	---
Prunus angustifolia	15	---	---	---	---	---
**P. caroliniana*	50	---	11	---	3	---
P. serotina	48	---	---	13	9	25
Ptelea trifoliata	5	---	---	---	---	---
Quercus chapmanii	8	---	---	---	22	19
Q. durandii	30	---	---	---	---	---
Q. falcata	7	---	---	---	3	37
Q. incana	---	---	---	---	22	37
Q. laevis	2	---	---	---	19	100
**Q. laurifolia*	100	38	22	13	50	6
Q. lyrata	5	---	---	---	---	---
Q. michauxii	33	---	---	---	---	---
**Q. myrtifolia*	8	---	---	---	12	19
Q. nigra	72	83	33	---	50	---
Q. shumardii	10	---	---	---	---	---
Q. margaretta	2	---	---	---	---	56
**Q. virginiana*	92	---	---	---	53	69
Rhamnus caroliniana	8	---	---	---	---	---
**Sabal palmetto*	52	88	---	7	19	---
Salix caroliniana	---	13	---	20	3	---
Sambucus simpsonii	---	41	11	---	---	---
Sapindus marginatus	8	---	---	---	---	---
Sassafras albidum	---	---	---	---	---	6
Taxodium distichum	8	88	11	---	---	---
T. ascendens	---	---	---	100	19	---
Tilia floridana	48	---	---	---	---	---
Ulmus alata	36	---	---	7	---	---
U. floridana	33	83	---	---	6	---
**Vaccinium arboreum*	61	25	44	13	22	---
Viburnum obovatum	---	17	11	---	---	---
Zanthoxylum clava-herculis	25	---	---	---	3	6
Number of tree species	71	30	27	18	42	26
Number of species/stands	20	14	10	8	10	8
Percent evergreen/stand	56	11	76	18	91	44

*Evergreen species.

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